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112 IDENTIFICATION OF INTERESTS

112.100 Statement as to Type of Entity

The Applicant, Sunnyside Cogeneration Associates ("SCA"), is a Utah joint venture between Sunnyside Holdings I, Inc. and Sunnyside II, L.P. Information regarding these entities and other parent or controlling corporations is described in the sections that follow.

112.210 Information Regarding the Applicant

Additional information regarding the applicant may be obtained by contacting:

Local
Sunnyside Cogeneration Associates
Attn: Plant Manager
P.O. Box 10
East Carbon, Utah 84520
EIN: 84-1027564
Phone: (435) 888-4476

Environmental Coordinator
Attn: Rusty Netz
One Power Plant Road, Sunnyside, UT 84539
P.O. Box 10
East Carbon, UT 84520
Phone: (435) 888-4476
Fax: (435) 888-2538

Utah Counsel
Fred W. Finlinson, Esq.
Brian W. Burnett, Esq.
Callister Nebeker & McCullough
10 East South Temple
Salt Lake City, UT 84133
Phone: (801) 530-7300

Safety / Environmental Manager
Attn: Neil Nelson
COSI
775 Sunrise Ave. S-200
Roseville, CA 95661
Phone: (916) 783-8616
fax: (916) 783-3831

General Manager
Kendall Reed
ACI
RR2 Box 56, Highway 3016
Clarion, PA 16214
Phone: (814) 226-8001
Fax: (814) 226-7909

112.220 Information Regarding the Resident Agent

Sunnyside Cogeneration Associates
Attn: Randy J. Scott, Plant Manager
P.O. Box 10, East Carbon, UT 84520 (mailing address)
One Power Plant Road, Sunnyside, UT 84539 (street address)
Phone: (801) 888-4476
EIN: 84-1027564

112.230 Information Regarding Abandoned Mine Land Reclamation Fee

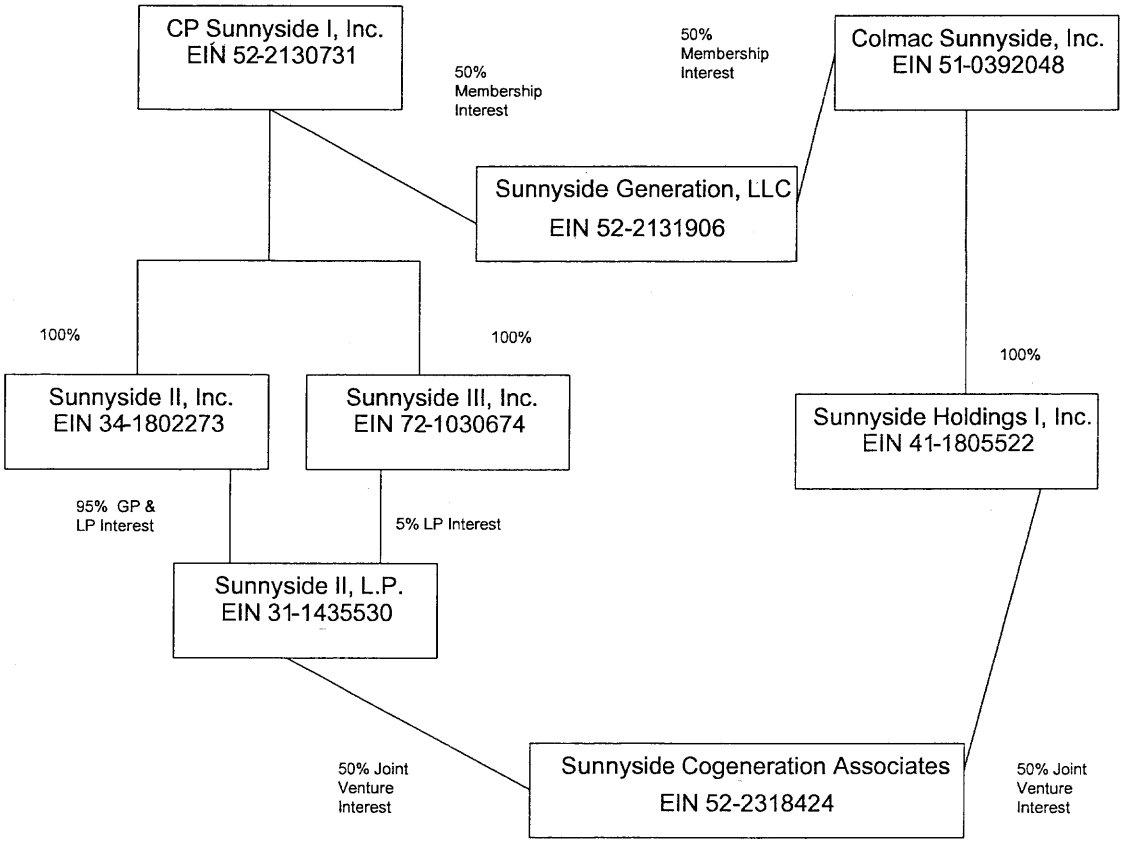
On July 27, 1994 the Office of Surface Mining found that the waste material located within the SCA Permit Area has no value and is not subject to reclamation fees. Correspondence relating to this matter is included in Appendix 1-1. OSM-1 to be filed.

112.300-330 Information Regarding "Owners" and "Controllers":

The Applicant, SCA, is a Utah joint venture. SCA holds the contracts, property, and permits for the project in its name. Because the joint venture is essentially a partnership between Sunnyside Holdings I, Inc. and Sunnyside II, L.P., SCA has no corporate information of its own. Therefore, the information required under regulation 112.300- 330 is provided for the joint venture partners, Sunnyside Holdings I, Inc. and Sunnyside II, L.P., and their parent or controlling corporations

The information relevant to Sunnyside II, L.P. traces to the parentage of CP Sunnyside I, Inc, and the information relevant to Sunnyside Holdings I, Inc. traces to the parentage of Colmac Sunnyside, Inc., as follows:

Sunnyside Organization Chart



CP Sunnyside I, Inc:

Directors:	Joe C. Turnage	
	James N. Willey	
Officers:	Joe C. Turnage	Chairman of the Board, and President
	James N. Willey	Vice President
	Dan R. Skowronski	Secretary
	Bruce R. Douglas	Treasurer

The address for the officers and directors is 111 Market Place, Suite 200, Baltimore, Maryland 21202. All Directors and Officers were elected Spring 2002.

CP Sunnyside Inc. is the Managing Member of Sunnyside Generation, LLC.

Sunnyside II, Inc. & Sunnyside III, Inc.:

Directors:	Joe C. Turnage	
	James N. Willey	
Officers:	Joe C. Turnage	Chairman of the Board, and President
	James N. Willey	Vice President
	Dan R. Skowronski	Secretary
	Bruce R. Douglas	Treasurer

The address for the officers and directors is 111 Market Place, Suite 200, Baltimore, Maryland 21202.All Directors and Officers were elected Spring 2002.

Colmac Sunnyside, Inc.:

Directors:	Willis S. McLeese	
	Greg Lawyer	
	Gilbert B. Warren	
Officers:	Willis S. McLeese	Chairman, CEO
	Greg Lawyer	President
	Robert S. McLeese	Chief Financial Officer

The address for the officers and directors is 103 Springer Building, 3411 Silverside Road, Wilmington, DE 19810. The Directors' and Officers' start date was October 15, 1999.

Sunnyside Holdings I, Inc.

Directors:	Willis S. McLeese	
	Greg Lawyer	
Officers:	Willis S. McLeese	Chairman, CEO
	Greg Lawyer	President
	Robert S. McLeese	Chief Financial Officer

The address for the officers and directors is 103 Springer Building, 3411 Silverside Road, Wilmington, DE 19810. The Directors' and Officers' start date was August 27, 1999.

2.340-420 Further Information Regarding Owners and Controllers

Neither Sunnyside II, L.P., nor Sunnyside Holdings I, Inc., nor their owners or controllers, has owned or controlled a coal mining and reclamation operation in the United States within five years preceding the date of this application, nor do they have any interest in any pending coal mine operation permit applications except for the following:

C/007/042 Star Point Waste Fuel, Wattis Utah.

Savage Industries, Inc.

Savage Industries, Inc., and unaffiliated third party, is contracted by SCA to remove waste coal from the refuse pile. The waste coal is utilized in SCA's adjacent electric generating plant. Information regarding Savage Industries follows:

Directors/Officers:

Neal Savage	Director &Chairman of the Board
Allen B. Alexander	Director &President
H. Benson Lewis	Director & Executive Vice President, Chief Financial Officer & Assistant Secretary
David Carlisle	Executive Vice President, Business Development
James T. Jensen	Executive Vice President, General Counsel & Secretary
L. Dean Rees	Vice President & Treasurer
Howard F. Goodman	Vice President & Controller
John K. Savage	Regional Vice President
Eric B Adamson	Vice President
C. Fred Bush	Vice President
Raymond Alt	Vice President

112.500 Surface and Mineral Property

There are no legal or equatable owner of the surface or mineral property to be mined other than the Applicant. Additionally, there are no leasehold interest nor any purchasers of record under a real estate contract for the property to be mined except for the following:

Sunnyside Project L.L.C., Utah limited liability company, has a leasehold interest in SCA's permit property.

112.600 Contiguous Property

The name and address of each owner of record of all property (surface and subsurface) contiguous to any part of the proposed permit area:

U.S. Department of the Interior
Bureau of Land Management
Utah State Offices
324 South State Street
Salt Lake City, UT 84101

Penta Creeks, L.L.C.
140 South Newton Street
Albert Lea, MN 56007

Magnificant 7, L.L.C.
140 South Newton Street
Albert Lea, MN 56007

Historical Properties, Inc.
207 Montgomery
Suite 215
Montgomery, AL 36104

East Carbon City
East Main St.
East Carbon, UT 84520

Sunnyside Land, L.L.C.
c/o Penrod Keith, Esq.
LeBOEUF LAMB GREENE & MacRAE
1000 Kearns Building
136 South Main St.
Salt Lake City, UT 84101
(Attorneys for the Chapter 7 Trustee)

Covol Technologies, INC.
11778 South Election Rd.
Suite 210
Draper, Utah 84020

Sunnyside Properties, L.L.C.
One Power Plant Road
PO Box 139
Sunnyside, UT 84539

112.700 MSHA Numbers

The MSHA numbers for all mine-associated structures that require MSHA approval:

Coarse Refuse Pile	1211-UT-09-02093-01
East Slurry Cell	1211-UT-09-02093-02
Excess Spoil Disposal Area #1	1211-UT-09-02093-04
Excess Spoil Disposal Area #2	1211-UT-09-02093-05

112.800 Applicants Interest in Contiguous Lands

Applicant holds a lease contiguous to the SCA Permit Area; specifically, SCA holds a lease on the 72.5 acres (directly north of the SCA Permit Area) upon which the cogeneration power plant is located. The area covered by SCA's leasehold interest is shown as "Lease Area" on Plate 1-1. In addition, SCA leases land from the City of East Carbon to the west of the Permit Area.

113 VIOLATION INFORMATION

113.100-250 Suspensions and Revocations

Neither the Applicant, nor any of its subsidiaries, affiliates, or persons controlled by or under common control with the Applicant 1) has had a federal or state mining permit suspended or revoked in the last five years, or 2) has forfeited a mining bond or similar security deposited in lieu of bond. Figure 1-4 includes documentation of recent OSM recommendations from the Applicant Violator System (AVS).

113.300 Violations and Unabated Cessation Orders

Sunnyside Cogeneration Associates received no notices of violation from the Utah Division of Oil, Gas and Mining (DOGM) within the three year period prior to the application for Permit Renewal. Information regarding these violations is described below:

There have been no any unabated cessation orders or unabated air and water quality violation notices received by any coal mining and reclamation operation owned or controlled by either the Applicant or by any person who owns or controls the Applicant.

113.310 Violation Information

None

114 RIGHT-OF-ENTRY INFORMATION

114.100 Description of Legal Documents

Sunnyside Fuel Corporation (a predecessor-in-interest to SCA) obtained fee title to the SCA Permit Area (and thus the legal right to enter and begin activities) pursuant to a Deed, Assignment, and Bill of Sale between Kaiser Fuel Corporation (a predecessor-in-interest to the existing permittee Sunnyside Coal Company) as Grantor, and Sunnyside Fuel Corporation, as Grantee, dated December 28, 1987, recorded December 29, 1987 at Book 277 of Record, Pages 679-690 at Carbon County, Utah. Sunnyside Fuel Corporation transferred its rights under the Deed, Assignment and Bill of Sale to the Applicant on or about April 1,1991. Applicant's right-of-entry is not the subject of any pending litigation. The legal description of the lands affected (*i.e.*, the SCA Permit Area) is set forth above at R645-303-322.

114.200-230 Private Mineral Estate

These sections do not apply because the private mineral estate has not been severed from the private surface estate.

115 STATUS OF UNSUITABILITY CLAIMS

115.100 Unsuitable Areas

The SCA Permit Area is not within an area designated unsuitable for coal mining and reclamation operations or is within an area under study for designation in an administrative proceeding under R645-103-300, R645-103-400, or 30 CFR Part 769.

115.200 Exemptions

This section is not applicable because Applicant does not claim the exemption described in R645103-333.

115.300 Public Roads

This section does not apply because Applicant does not propose to conduct coal mining and reclamation operations within three hundred feet of an occupied dwelling or within 100 feet of a public road.

116 PERMIT TERM

116.100 Start and Termination Dates

A waste disposal facility, which will comprise a portion of a coal mine waste fired electric power plant, is located adjacent to the SCA Permit Area and has been operational since 1993. Figure 1-6 includes documentation of recent permit term approvals. The refuse pile located in the SCA Permit Area is being reclaimed over an approximate 30-year period by burning it in the adjacent facility.

116.200-220 Term in Excess of Five Years

These sections do not apply because Applicant does not require an initial permit term in excess of five years in order to obtain necessary financing for equipment and the opening of the operation.

117 INSURANCE

117.100 Liability Insurance

A copy of the certificate of liability insurance is attached at Figure 1-1 hereto.

117.200 Proof of Publication

A newspaper advertisement, Figure 1-2, has been published in the "Sun Advocate", "The Salt Lake Tribune" and "The Deseret News" for four (4) weeks following the determination of completeness. Proof of publication of the newspaper advertisements is given in Figure 1-3.

117.300 Shared Facilities

This Section does not apply because there are no plans of a facility or structure that is to be shared by two or more separately permitted coal mining and reclamation operations.

118 APPLICATION FEE

The required filing fee of $5.00 was submitted with the original Permit Application.

123 VERIFICATION

The required verification statement is included in Figure 1-5.

130 REPORTING OF TECHNICAL DATA

SCA, in the preparation of this permit document, has compiled and relied on data and maps from previous permit applications and previously approved permits for the Sunnyside Coal Company's (SCC) mines. Information regarding preparers can be found in the SCC Permit document. Any additional studies, which SCA has performed, include preparers name, methods, and other information.

140 MAPS AND PLANS

Maps submitted herewith are presented in a consolidated format, to the extent possible, and include the types of information that are set forth on U.S. Geological Survey of the 1:24,000 scale series. The maps of adjacent areas will clearly show the lands and waters within those areas and are at the scale determined by DOGM. The maps and cross-sections associated with this Permit are listed in the General Table of Contents.

150 COMPLETENESS

This Permit Application contains the information required by R645-301; R645-302 is not applicable.

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200 SOILS

210 INTRODUCTION

211 thru 212 General Requirements

The refuse disposal area previously created by the Sunnyside Coal Company (SCC) has been acquired by Sunnyside Cogeneration Associates (SCA) to serve as a long-term supply of waste fuel for its coal mine waste-to-energy facility, located adjacent to the SCA Permit Area. SCA's alternative energy project has been approved by the Federal Energy Regulatory Commission as a Qualifying Facility, based on the usage of coal mine waste as fuel in its fluidized-bed combustion boiler. SCA will use "active waste" from off-site processing plants/refuse piles, "accumulated waste" from refuse piles, and other alternative fuels as sources of waste fuel for the facility. SCA's fueling plan includes excavation of coal mine waste from the existing refuse pile, which began as early as January 1993.

Based on SCA's contract for the sale of electricity to Utah Power and Light, handling coal mine waste to serve as an alternative energy fuel will be a consistent and continuous process. Coal mine waste that continues to be generated by off-site preparation plants and other coal materials as discussed in Chapter Nine, will also be factored into SCA's fueling strategy, which can allow direct acceptance of coal mine waste at the facility, or temporary placement within the approved storage areas or the refuse disposal area prior to utilization.

SCA will excavate coal mine waste from the refuse disposal area based on sampling and analyses and a materials handling plan which will be periodically updated by SCA. Excavation of the coal mine waste will be considerate of material quality, pile and embankment stability, and mine operation. Over the life of SCA's facility, nearly all of the coal mine waste will be burned to generate electricity, resulting in significantly less material that will need final reclamation. Final reclamation of the refuse pile will be accomplished after all of the coal mine waste is either burned as a fuel, or repositioned within the refuse disposal area for final disposal, if determined to be unacceptable as fuel material (i.e., ashes, rock, soil, etc.).

This chapter contains information concerning the soil characteristics, chemical and textural analyses and soil handling procedures. Additional details on mining and operations can be found in Chapter Nine, Mining Plan. Chapter Ten, Reclamation Plan presents details on final reclamation.

It should be noted that SCA has compiled and relied on data and maps from previous approved permits for the SCC mines. The Soil Section has been appended to reflect the SCA Sunnyside Permit Area. In this Permit Application where the "permit area" is used, the SCA Sunnyside Permit Area is to be assumed unless the larger overall area for the SCC mines is specifically referred to in the text as the "original SCC permit area."

220 ENVIRONMENTAL DESCRIPTION

221 Prime Farmland Investigation and Determination

The Soil Conservation Service (SCS) study of the SCA Permit Area, shows that no soil mapping units or areas have been designated as Prime Farmland. Figure 2-1 is a letter from Ferris P. Allgood, State Soil Scientist, stating that the soils in the Permit Area do not meet the criteria of either Prime or Important Farmlands. Additionally, Figure 2-1 includes an AD-1006, Farmland Conversion Impact Rating for the SCA Permit Area.

222 Soil Survey Information

The Soil Conservation Service's Survey of Carbon Area, Utah (Issued June 1988) was used for the soil survey on the SCA Permit Area and was the primary source of soils information. Plate 2-1 contains soil identifications for the SCA Permit Area and surrounding properties based on the SCS's soil survey. Plate 2-1 also identifies the locations where soil samples have been taken and where the results from the analysis can be found.

Within the SCA Permit Area, five soil mapping units and three soil series were identified. The soil mapping units include:

Soil Mapping Unit Name	Number
Badland-Rubbleland-rock outcrop complex	3
Gerst-Strych-Badland complex, 3 to 50 percent slopes	36
Strych very stony loam, 3 to 15 percent slopes	113
Strych very stony loam, dry, 3 to 30 percent slopes	114
Travessilla-Rock outcrop-Gerst complex	121

The soil mapping unit names and numbers are taken from the Soil Survey of Carbon Area, Utah. Detailed descriptions of the soil mapping units within the SCA Permit Area are presented in Appendix 2-1. Detailed descriptions of the soil seriesunits within the SCA Permit Area are presented in Appendix 22.

Plate 5-1 (A-E), Surface Facilities outlines each of the topsoil and borrow areas. Plates 3-1, 3-1A, 3-1B, 3-1C, 3-1D, and 3-1E show the pre-law, post-law and future (anticipated) disturbed areas for the SCA Permit Area.

An "Order One" soil survey was conducted by the SCS (see Appendix 2-8) and an additional soil testing program was conducted by ACZ (see Appendix 2-9) on the following areas:

Industrial Borrow Areas One through Three
Reclamation Borrow Area
Proposed Access Road (shown in Plate 5-3)
Material placed on Coarse Refuse Lifts (Sub-Area 1)
Sub-Area 3

Range conditions for the SCA Permit Area indicate that the current productivity of this area ranges from 500 to 650 pounds per acre (air dry weight) under normal year conditions (Figure 3-4). Descriptions of

analyses, methodology and results are included in R645-301-321, Vegetation Information.

Appendix 2-10 contains the results of soil sample analysis performed in connection with the reclamation of the Old Coarse Refuse Road. The sampling locations are identified on Plate 21.

Appendix 2-11 contains the results of soil sample analysis performed to evaluate the condition of the existing interim reclamation cover in terms of its suitability for final reclamation requirements. Samples were taken to evaluate the following areas: The south embankment of the East Slurry Cell; The east embankment of the East Slurry Cell; The north embankment of the West Slurry Cell; The First lift of the Coarse Refuse Pile; The Second lift of the Coarse Refuse Pile; The Third lift of the Coarse Refuse Pile; and The Fourth lift of the Coarse Refuse Pile. The samples analyzed met the requirements for use as final reclamation cover. Therefore, Plate 8-4 reflects these areas as potentially needing an average of two feet of additional borrow material for reclamation in the event of bond forfeiture.

223 Soil Characterization

The soil survey information outlined above was taken directly from the Soil Survey of Carbon Area, Utah, published by the Soil Conservation Service, United States Department of Agriculture. See Appendix 2-9 for detailed soil characterization for the Reclamation Borrow Area, Industrial Borrow Area Three, Industrial Borrow Area One, Coarse Refuse Lifts (Sub-Area 1) and Sub-Area 3.

224 Substitute Topsoil, Physical and Chemical Properties of Soils and Results of Analyses, Tests and Trials

Several borrow areas have been identified for use in future reclamation (Plate 5-1 and Plate 2-1). The quantity of available borrow material as indicated in Appendix 2-9 is outlined below.

	Potential Borrow Area		
Soil Map Units	Reclamation Borrow Area (22 Acres)	Industrial Borrow Area 1 (7 Acres)	Industrial Borrow Area 3 (3.6 Acres)
A. Strych gravelly sandy loam rec. salvage depth volume (acre ft./ac.)	17.5 acres (79.6%) 276" 23	4.9 acres (70%) 264" 22	0.7 acres (19.4%) 276" 23
B. Strych very stony sandy loam rec. salvage depth volume (acre ft./ac.)	2.6 acres (11.8%) 276" 23	0 0 0	0.2 acres (5.6%) 276" 23
C. Disturbed Land rec. salvage depth volume (acre ft./ac.)	1.9 acres (8.6%) 0 0	1.8 acres (25.7%) 0 0	2.7 acres (75%) 0 0
D. Strych gravelly sandy loam, thick surface rec. salvage depth volume (acre ft./ac.)	0 (0%) 0 0	0.3 acres (4.3%) 264" 22	0 (0%) 0 0
Total Volume Salvageable Soil	23 ac. ft/ ac (20.1 ac.) 745,844 cu. yds.	22 ac. ft./ac. (5.2 ac.) 184,565 cu. yds.	23 ac. ft./ac. (0.9 ac) 33,396 cu. yds.
Grand Total: 963,805 cu. yds.			

Detailed results of sampling and testing for the areas outlined above, can be found in Appendix 2-9. The following is an excerpt from Appendix 2-9 describing the Strych soil. Because all the sampled soil profiles classified as the Strych soil the following serves as a statement for the entire natural soil, potential reclamation material resource at the SCA site.

> "The Strych soil was described and sampled at location RB-3, RB-7, RB-10, IB3-1, and IB1-1. Review and evaluation of the field description and laboratory was conducted. Soil pH's were all acceptable with no values > 9.0 or < 4.5. Values were all in the 8 range. Some of the lower zones had a pH of 8.5, 8.6, or 8.7 and these are considered poor in the UDOGM table, but in general, the data suggest a fair rating for pH.
>
> All of the electrical conductivity values (EC) are rated either good or fair. None exceed the value of 8 considered to be poor. Many values are less than 1.0. All saturation percent values are good (25 to 80%) with one exception - the 8- to 16-inch depth (part of the calcic horizon) of profile IB1-2 is 90.6. Soil textures were all good or fair with only one two-foot interval (16- to 18-feet of profile IB1-2) being rated poor with a sand texture. Most textures werea gravelly sandy loam.

Most sodium absorption ratio values (SAR) are rated good (<5). Four samples had SAR values between 5 and 5.6. Three other values were between 8.2 and 8.5. Two values were 10.4 and 11.0 respectively. SAR should not be considered limiting for this project.

Rock fragment content (percent coarse fragments) varies within any soil profile and across the study area. Review of the Strych coarse fragment data suggests the only limiting feature is the variable presence of boulders in the upper few feet across the study area. These can be segregated during salvage as is the current practice at SCA today. The boulders can be used as riprap for other purposes. Perhaps 5% of the overall volume of salvageable soil is boulders."

230 OPERATION PLAN

231 General Requirements

Generally, the land within the SCA Permit Area has been disturbed. Plates 3-1, 3-1A, 3-1B, 3-1C, 3-1D, and 3-1E outline the pre- and post-law disturbed areas. Most of the major disturbed areas were created prior to the 1977 Act and therefore little topsoil has been saved. The few topsoil stockpile areas are shown in Plate 5-1, Surface Facilities.

It is anticipated that only a small portion of additional land will be disturbed during the mining activities. These lands include the borrow areas. The following potential impacts to soil resources could result from the mining activities: removal of vegetation, disturbance and exposure of the soil, mixing of soil horizons, loss of topsoil productivity, increase in the susceptibility of the soil to subsequent wind and water erosion, and loss of the soil resource.

Mitigation measures for soils during mining are closely tied to mitigation measures associated with controlling erosion caused by water, wind, loss of vegetation, and construction procedures associated with stockpiling topsoil, and reclamation. The objective of implementing the measures outlined in the following sections is to reduce soil erosion and compaction, enhance revegetation of disturbed areas, and provide for long-term conservation of the soil resource within the SCA Permit Area. All potential impacts to soils identified above will be avoided or reduced to levels of nonsignificance.

Additional details on activities that will occur during mining are included in Chapter Nine.

Methods for Removing and Storing Topsoil, Subsoil, and Other Materials

Handling of topsoil during mining operations will involve removal of vegetation, topsoil stripping, stockpiling, and replacement of the topsoil onto the areas to be reclaimed. Trees and large shrubs will be removed prior to topsoil removal. Small shrubs, grasses, and forbs will be collected with the topsoil material since these materials increase both the available organic matter in the soil and the available seed stock.

Prior to any surface disturbance in previously undisturbed areas or reclaimed areas topsoil will be removed. Topsoil removal and handling will be accomplished with front-end loaders, and trucks. Topsoil storage piles will be adjacent to existing topsoil piles (shown in Plate 5-1) or other areas adjacent to the disturbance.

New topsoil storage piles will be contoured to minimize soil loss and seeded with a seed mixture consisting of rapidly establishing grasses and forbs (see Chapter Nine, Section 9.9.2 for interim seeding schedule). Fertilizer will not be required for stockpiles. A small berm will be constructed at the base of the new topsoil piles as interim containment of soil that may be displaced while vegetation becomes established. Calculations to determine the size of the berm are found in Appendix 7-7. Activity around the stockpiles will be minimized so that damage to the piles will be reduced.

Suitability of Topsoil Substitutes

Several borrow areas have been identified for use in future reclamation (Plate 5-1). The quantity of available borrow material that has been identified, is outlined in Section 224.

Areas which will receive borrow area soil and the surface area upon which the borrow material will be utilized as a plant growth medium is shown in Plates 10-1.

In 1985 a soils investigation was conducted on the Reclamation Borrow Area to locate additional suitable borrow material (Appendix 2-4) for reclamation activities. This investigation included a soil survey and soil sampling using test pits. Four test pits were dug and were identified as ST1, ST2, ST3 and ST4. The location of these pits is shown in Plate 2-1. A determination was made on the soil physical and chemical properties, its susceptibility to erosion, suitability for topsoil, and the soils feasibility for reclamation. This investigation showed that the soil in the Reclamation Borrow Area is rated fair for use as borrow material and should be suitable for vegetation establishment.

Results of the studies conducted in 1985 on the three Industrial Borrow Areas are included in Appendix 2-5. The information includes test methods, laboratory procedures, and sampling results. Borrow from each of these areas was found to be suitable as a substitute materialfor topsoil.

Revegetation test plots have been approved by DOGM and will evaluate revegetation success under several soil depths, amendments, and seeding regimes. Additional analysis of the revegetation test plots is currently proceeding. The results of these tests, should provide information concerning the most appropriate reclamation techniques and procedures to ensure revegetation success. The design of the revegetation test plot is included in Appendix 2-6. A report from a 1982 study on this test plot is included in Appendix 2-3.

Testing Plan for Topsoil Handling and Reclamation

Details on testing for topsoil and borrow material handling and reclamation can be found in Chapter Nine, Mining Plan, Sections 9.8, 9.9 and 9.11, as well as Chapter Ten, Reclamation Plan, Sections 10.7 through 10.9.

232 Topsoil and Subsoil Removal

Handling of topsoil during mining operations will involve removal of vegetation, topsoil stripping, stockpiling, and replacement of the topsoil onto the areas to be reclaimed. Trees and large shrubs will be

removed prior to topsoil removal. Small shrubs, grasses, and forbs will be collected with the topsoil material since these materials increase both the available organic matter in the soil and the available seed stock.

Prior to any surface disturbance in previously undisturbed areas or reclaimed areas topsoil will be removed. Topsoil removal and handling will be accomplished with front-end loaders, and trucks. Topsoil storage piles will be adjacent to existing topsoil piles or other areas adjacent to the disturbance.

Topsoil storage piles will be contoured to minimize soil loss and seeded with the interim seed mixture shown in Chapter Nine, Section 9.9.2. Fertilizer will not be required for stockpiles. A small berm will be constructed at the base of the new topsoil piles as interim containment of soil that may be displaced while vegetation becomes established. Calculations to determine the size of the berm are found in Appendix 7-7. Activity around the stockpiles will be minimized so that damage to the piles will be reduced.

233 Topsoil Substitutes and Supplements

See Sections R645-301-224 and 231.

234 Topsoil Storage

Very little topsoil will be available for use in reclamation for any lands that were disturbed prior to the 1977 Act, because topsoil material was not salvaged. However, in recent times prior to re-disturbance of some areas, stockpiles of soil materials were saved. The location of each topsoil stockpile is indicated in Plate 5-1. Topsoil stockpile cross-sections are provided in Plates 5-5 (A-E). The quantity of material contained within each stockpile is outlined as follows (seePlates 5-5 (A-E) for calculations):

Quantities of Stockpiled Topsoil

Stockpile Location	Quantity (c.y.)
Borrow Area Topsoil Pile	651
Slurry Pond Topsoil Pile	677
New (Lower) Haul Road Pile	2,202
Rail Cut Pond Topsoil Pile	378
Coarse Refuse Toe Topsoil Pile	197
Hoist House Topsoil Pile	152
Access Road Topsoil Pile	221
Clearwater Pond Topsoil Pile	2,916
Storage Area 1 Topsoil Pile	534
Total	7,928

The soils contained in these stockpiles are currently committed for use in topsoiling the sites from where the soils were removed. Soil Analysis Results for the Slurry Pond Pile are included in Appendix 2-7. The information includes test methods, laboratory procedures, and sampling results.

240 RECLAMATION PLAN

241 General Requirements

Reclamation essentially commences with the first ton of coal mine waste removed and used as an alternative energy fuel. Reclamation will be a continuous process over the life of the site, ultimately grading, covering and revegetating any remaining non-combustible materials. The final surface contour plan for the SCA Permit Area will reestablish the surface contours to approximately those that existed before mining operation disturbance.

Details on interim reclamation can be found in Chapter Nine. Final reclamation is outlined in Chapter Ten.

250 PERFORMANCE STANDARDS

251 thru 252 Topsoil, Removal, Maintenance, and Redistribution

Any requirements of this section pertaining to topsoil and topsoil substitutes or supplements and their removal, maintenance, and redistribution are identified within sections 230 where applicable.

Monitoring for compliance and successful implementation of the mitigation measures would be under the direction of the DOGM. All potential impacts to soils identified previously will be avoided or reduced to levels of nonsignificance. With the implementation of the identified mitigation measures no anticipated adverse impacts to soils from mining activitieswould be expected.

Additional performance standards for reclamation are outlined in Chapter Nine, Mining Plan and Chapter Ten, Reclamation Plan, Redamation Performance Standards.

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410 INTRODUCTION

The refuse disposal area, previously created by the Sunnyside Coal Company (SCC), has been acquired by Sunnyside Cogeneration Associates (SCA) to serve as a long-term supply of waste fuel for its coal mine waste-to-energy facility, located adjacent to the SCA Permit Area. SCA's alternative energy project has been approved by the Federal Energy Regulatory Commission as a Qualifying Facility, based on the usage of coal mine waste as fuel in its fluidized-bed combustion boiler. SCA will use "active waste" from-off-site processing plants/refuse piles, "accumulated waste" from refuse piles, and other alternate fuels as sources of waste fuel for the facility. SCA's fueling plan will require excavation of coal mine waste from the existing refuse pile, which began as early as January 1993.

Based on SCA's contract for the sale of electricity to Utah Power and Light, handling coal mine waste to serve as an alternative energy fuel will be a consistent and continuous process. Coal mine waste that continues to be generated by off-site preparation plants will also be factored into SCA's fueling strategy, which can allow direct acceptance of coal mine waste at the facility, or temporary placement within the refuse disposal area prior to utilization.

SCA will excavate coal mine waste from the refuse disposal area based on sampling and analyses and a materials handling plan which will be periodically updated by SCA. Excavation of the coal mine waste will be considerate of material quality, pile and embankment stability, and mine operation. Over the life of SCA's facility, nearly all of the coal mine waste will be burned to generate electricity. Final reclamation of the refuse pile will be accomplished after all of the coal mine waste is either burned as a fuel, or repositioned within the refuse disposal area for final disposal, if determined to be unacceptable fuel material (i.e., ashes, rock, soil, etc.).

Currently, there are activities that occur outside the Sunnyside Cogeneration Associates Permit Boundary that have significant bearing on the operations of the SCA Cogeneration facility and the SCA Permit Area. These activities occur in conjunction with the SCA permit site.

In order for SCA to acquire the quality and quantity of fuel for the cogeneration facility, coarse or fine refuse materials maybe accepted from off-site facilities as needed. The refuse is stockpiled in designated areas within the SCA permit site then mixed with existing refuse on the SCA permit site and transported to the cogeneration facility. These operations; acceptance of refuse from off-site facilities and the transporting of coarse refuse to the cogeneration facility, require access roads that extend beyond the limits of the SCA permit boundary.

In addition to the access roads mentioned above, there are access roads to the south of the SCA permit boundary that are utilized for the purposes of the SCA operations. These roads are utilized to access areas of the SCA permit site that are inaccessible from the north side of the permit area. They are used by authorized contractors of SCA for the purposes of such activities as: water quality monitoring, periodic inspections, and site maintenance as needed.

Activities that occur outside the SCA Permit Area also include watersheds outside the permit area that drain into contained areas within the permit area. Chapter Seven of the Permit outlines these watersheds and the areas to which they drain. Also included are detailed maps and calculations showing the amount of water from each watershed and the capacity of the drainages and ponds that were constructed to contain them. In some instances, a drainage commencing within the SCA Permit Area may extend beyond the limits of the SCA

permit boundary. An example of this is the outlet of the Pasture Sediment Pond. In such a case, SCA commits to maintaining this drainage and providing the necessary information to the Division to show its adequacy to handle the required storm event. In the event that this occurs elsewhere within the permit area, SCA will handle each instance on a case-by-case basis and notify the DOGM of any proposed changes to the Permit.
It should be noted that the SCA operations encompass a number of entities that do not necessarily lie or operate within the permitted area. The activities that occur outside of the permitted area are done so in a controlled manner, under permits from other agencies, and have been incorporated into the entire design and plan of the SCA Cogeneration facility. SCA understands the implications of utilizing entities outside of the permitted area. SCA commits to maintaining the applicable Permit Areas in accordance with DOGM requirements.

This chapter includes descriptions of the premining and proposed postmining land use(s) in accordance with the applicable regulations. It should be noted that SCA has compiled and relied on data and maps from previously approved permits for the SCC mines. In this Permit Application where the "permit area" is referred to, the SCA Sunnyside Permit Area is to be assumed unless the larger overall area for the SCC mines is specifically referred to in the text as the "original SCC permit area."

411 ENVIRONMENTAL DESCRIPTION

Premining Land-Use Information

The land within the SCA Permit Area has beenconfined to fish and wildlife habitats. Historically, the land within the SCA Permit Area has not been used for croplands because of the mountainous terrain, steep slopes, and rocky surfaces. Farming in the surrounding area is limited to small areas on canyon bottoms. About four acres of alfalfa, irrigated with mine water, has been farmed in the past adjacent to the SCA Permit Area. Plate 1-1 outlines the boundaries of ownership of the areas within andadjacent to the SCA Permit Area.

Premining land-use information is further outlined in the following sections. The descriptions include cultural and historic resources information, complete narratives of the land-use capabilities, and descriptions of the existing land uses and land-use classifications under local law as required by regulations R645-301-411.120 through R645-301-411.140.

Maps and Narratives Describing Existing Land Uses

The information on land status and land use has been obtained primarily from SCC's records and internal sources as well as from Carbon County records. Currently the site is mostly disturbed. The Disturbed Area Map, Plate 3-1, outlines pre and post-law disturbed areas within the SCA Permit Area.

Information on regional land use and socioeconomic considerations has been derived impart from the "Final Environment Statement, Development of Coal Resources in Central Utah" by the U.S. Geological Survey (1978) and from the Utah Office of Planning and Budget's Report "1990 Statistical Abstract of Utah" which covers quite fully the subject matter for the area of interest. It is assumed that the socioeconomic conditions of the area have not changed dramatically over the past decade and that the SCA activities will have much of the same impact as the SCC mines to the surrounding communities.

Land Use Narrative

Regionally, about 76% of the surface lands are Federal. Only a small part of the total acreage is irrigated

farmland. Prime farmland has not been identified within the SCA Permit Area. Figure 2-1 is a current letter from the Soil Conservation Service stating that there is no prime or important farmland within or adjacent to the SCA Permit Area. The SCA Permit Area land use is dominated by a refuse pile. It is estimated that approximately 57% of the SCA Permit Area has been disturbed by mining operations. The disturbed areas contained mostly Pinyon-Juniper/Grass and Atriplex/Grass type vegetation.

The SCA cogeneration operations constitute a major factor in the local economy. The operations are of significant importance to the socioeconomic well being of the area. The "1990 Statistical Abstract of Utah" provides figures showing that mining accounts for 17.14% of all non-agricultural jobs and pays the highest of all non-agricultural fields in Carbon County. These figures are presented in Figure 42.

Local Laws Regarding Land Use Classifications

The Permit Area and adjacent areas fall within the jurisdiction of East Carbon City, Sunnyside City, and Carbon County. All three entities have zoning and land-use ordinances which allow the types of activities associated with the SCA facilities. Selected zoning information available from these entities is found in Appendix 4-4.

Cultural and Historic Resources Information

Appendix 4-5 incorporates a copy of "A Stratified Archeological Sample Survey of Kaiser Steel Corporation Sunnyside Mine Lease, Carbon County, East Central Utah." This document was obtained from the Kaiser Steel 1985 Permit on file with the Utah DOGM. This document was prepared, under contract to Kaiser Steel Corporation, by the Consulting Services Branch, Antiquities Section of the Utah Division of State History who also conducted the field survey. The survey included the entire Kaiser area in the early 1980's. The SCA permit area was a portion of the Kaiser areaat that time and was included in the survey.

A cultural resource survey of the SCA Permit Area was completed by the Utah Historical Society Preservation Office Survey and Planning staff in the fall of 1993 (Appendix 4-3). There are two sites potentially eligible for nomination with the National Register within the SCA Permit Area and adjacent area: the coke ovens located on Site 42Cb325 (within the SCA Permit Area) and a cemetery located on Site 42Cb538 (adjacent to the SCA Permit Area). Site descriptions for each site are included in Appendix 4-1 and Appendix 4-5. Plate 4-2 shows the location of the coke ovens, the cemetery, and other sites adjacent to the SCA Permit Area which are mentioned in the following paragraphs. It should also be noted that no prehistoric sites were recorded prior to this study.

Located in Section 6, Township 15 South, Range 14 East are approximately 26 coke ovens remaining from the original 800. Coal from the mine was brought down by rail into the top of the coke ovens, and the oven was given a "charge" through a hole in the top. After 72 hours, the coked coal was removed from an opening on the side and loaded onto another rail car. These coke ovens are the only physical remains from the era when Sunnyside coke was used widely throughout the western United States for smelting.

The site containing the cemetery consists of a badly disturbed cemetery located in the approximate center of the SCA cogeneration power plant site. It is completely riddled with prairie dog holes and vandals have been quite active, tipping over headstones. An unknown number of graves are present. The few headstones present (ca. 20, including fragments) appear to be handmade out of a variety of substances (cement, wood, wrought iron). No complete death notices are present and most of the headstones are weathered beyond recognition. What few are partially readable appear to be Hispanic names with deaths during the first decade of this century. Several graves are enclosed by bedsteads and commercial wrought iron fencing material. SCA has erected a chain-link fence around the perimeter of the cemetery to protect it from disturbance.

There are two other sites that are listed as non-significant by the National Register and consequently, are not considered to be potentially eligible for registration as Historical Places. The first of these consists of a diffuse, non-patterned scatter of plus or minus 50 interior and secondary flakes and one possible biface fragment (Site 42Cb539) located above the head and north of Icelander Creek. The second site consists of an extensive distribution of burned coal slag and clinkers and domestic and industrial trash situated on a broad sage covered flat (Site 42Cb540). This site is located on the outskirts of East Carbon City.

Cultural and Historic Resources Sites

As stated previously, the only historic site identified within the SCA Permit Area is the coke ovens site which is located in Site 42Cb325. The coke ovens are located about 400 meters east of Sunnyside on the edge of the refuse pile (see Plate 4-2). At the present time, twenty-six of the ovens remain. Several have been previously destroyed in the north end to accommodate the expansion of the refuse pile. The ovens are beehive-shaped with level roofs for "charging". The door openings, which all face east, are large enough to walk into a cavern about 2.3 meters high and 3 meters in diameter. Varying amounts of vandalism has occurred to the ovens and they remain in uncertain states of stability.

Within the SCA Permit Area, there are no units of the National System of Trails or the Wild and Scenic Rivers System.

Projected Impacts and Preventative Measures to Cultural and HistoricalResources

The identified sites have coexisted with the Sunnyside mines for over ninety years. All sites have been affected by past activities.

There are three potential types of impacts that could affect the cultural resources in the SCA Permit Area. The first type includes naturally occurring events such as erosion, flooding, fire, landslides, earthquakes, etc. No mitigation efforts are planned for these naturally occurring impacts.

The second type of impact is vandalism. This occurs in the form of illegal excavations (relic hunting), destroying standing walls, defacing rock art or architecture with paint, target practice, etc., or illegally removing surface artifacts. Vandalism cannot be totally prevented, but can be curbed. SCA will be on the alert for, and remove people from, the sites that are on the National Register. SCA has erected a chain-link fence around the cemetery to protect it from vandalism. SCA will also enclose the area surrounding the coke ovens with stakes, flags, signs or other markers. See Plate 3-1 for the approximate location of these markers. No construction activity will be permitted to occur within this marked area.

A third type of impact results from construction, gaining access to specific area (roads and trails), or any other human related ground disturbance. SCA will either avoid the National Register quality sites or undergo specific mitigation procedures prior to the impact of the site. At the present time, planned ground disturbance within the SCA Permit Area will not impact any known cultural resources.

Sensitivity Zones

The application of predictive models to develop sensitivity maps for cultural resource management has been completed for the original SCC Permit Area. The long term purpose of such maps is to release some areas from further requirement under federal cultural resource laws while concentrating concern on high probability areas (Reed and Nickens 1980). The result of such an attempt for this project is shown on Plate 43.

Three zones are outlined on Plate 4-3. The zones are designated as "high", "medium", or "low". The high density areas are limited to the primary canyon bottom and the first or second contour (12 to 13 meters) above

the canyon floor, plus the valley pediment. High sensitivity areas have deep soils, open sage parks, and are at least 30-40 meters wide. Site density is about 1.12 sites per square mile. Medium sensitivity areas are limited to high altitude (2280 meter a.s.l.) flat benches. Medium sensitivity areas average about .85 sites per square mile. The remaining area is classified as low density and includes the talus/cliff slopes and the narrow (30 meters or less) secondary canyons. Average site density are less than .10 sites per square mile.

The entire SCA Permit Area is located within a high sensitivity zone. The majority of the land surrounding the SCA Permit Area lies within low sensitivity zones with the exception of a few small areas that are characterized by high altitude flat benches, consequently lying inmedium sensitivity zones.

Based on the existing data, the following future management programs will be implemented in order to preserve the land within the SCA Permit Area:

1. All sites listed as eligible for nomination to the National Register of Historic Places be protected from impacts by the SCA cogeneration project. As described earlier, the areas have been fenced or will be identified with stakes and flagging so that the areas are not disturbed.

2. For eligible sites threatened by future mining impacts, SCA will instigate a program of adequate mitigation prior to impact as negotiated with the State Historic Preservation Officer.

Previous Mining Activity

The SCA Permit Area has not, and will not be used for subsurface mining operations. The SCA Permit Area that is being addressed in this report is associated only with operations related to coal mine waste disposal and excavation. Mining activities associated with disposal of coal mine waste have been occurring in this area for several decades.

411.210 Type of Mining Methods Used

Details on mining methods can be found in Chapter Nine, Mining Plan. Additional operational information is included in Chapter Five.

Coal Seams or Other Mineral Strata Mined

SCA is excavating a waste coal refuse pile rather than mining an underground coal seam.

Approximate Dates of Past Mining

The original SCC permit area has been mined continuously since the late 1890's. Over sixty million tons of coal has been extracted during this period. Kaiser Steel Corporation leased the No. 2 Mine from Utah Fuel Company in 1942 to provide coking coal to the newly constructed steel mill at Fontana, California. In 1950, Kaiser Steel purchased the entire property. Subsequently, ownership changed hands to SCC and a small portion, for which this Permit Application applies, is now owned by SCA. Plate 1-1 shows the boundaries and ownership of the areas surrounding the SCA Permit Area. It should be noted that there are no underground mines within the SCA Permit Area. All the underground mines lie within areas outside of the SCA Permit Area and are either abandoned or operated in accordance with other mining permits.

412 RECLAMATION PLAN

Postmining Land-Use Plan

Reclamation essentially commenced with the first ton of coal mine waste removed and used as an alternative energy fuel. Practices will be limited to excavation and handling of coal mine waste to segregate non-combustibles and redisposing of such materials in a controlled manner. SCA's operating plan for its adjacent alternative energy power plant is designed to substantially reduce the final quantity of coal mine waste which will ultimately remain within the existing refuse disposal area. Reclamation will be a continuous process over the life of the mining operation, ultimately grading, covering and revegetating any remaining non-combustible materials.

Details on interim reclamation can be found in Chapter Nine, Mining Plan. Chapter Ten, Reclamation Plan outlines components of the final reclamation plan.

The following sections outline the proposed use of the SCA Permit Area, capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land-use policies and plans.

Existing land-use adjacent to the SCA Permit Area is primarily fish and wildlife habitat, limited grazing, and minimal cropland. The land-use picture has not changed significantly and is not expected to deviate in the future. Post project land use will be fish and wildlife habitat.

Soil Suitability

Several borrow areas have been identified for use as topsoil in future reclamation (Plate 5-1). A discussion of the suitability of the soils and their capability to support the post-mining land use is included in Chapter Two in the section titled "Suitability of Topsoil Substitutes."

Control Measures to Mitigate Impact

Control measures to mitigate impacts on present land-use include steps to protect surface waters, soil resources, vegetation, and fish and wildlife. Additional information can be found in Chapter Two (Soils), Three (Biology), and Seven (Hydrology) which detail mitigation measures.

Wildlife Species and Habitat Requirements

Many fish and wildlife species and their specific habitat requirements are listed in Chapter 3, Section 322. This section includes information on macroinvertebrates, fish, amphibians, reptiles, birds, and mammals. The section discusses many species which are not expected to inhabit the area in great abundance, but it is hoped that a large variety of the identified species will find the post-mine reclaimed area suitable for habitat. The wildlife species most likely to inhabit the reclaimed site would include a variety of birds; larger mammals such as deer, elk, and coyote; small mammals such as marmots, ground squirrels, chipmunks, rabbits and other ground dwelling rodents; snakes and other small reptiles; and potentially small amphibians.

Details found in Chapters Nine and Ten concerning the reclamation plan are anticipated to establish a variety of features which can provide habitat for many different species. For example, placement of rock piles provides habitat for small mammals, reptiles and amphibians; and planting groups of pinyon/juniper tublings provides habitat for larger mammals, small mammals, birds, and other wildlife.

Vegetation species which are anticipated to be established in the reclaimed site have been incorporation into the designed and approved seed mixes. The native vegetation species have been selected for the value to habitat of different wildlife species and the ability to establish themselves in this particular area. Tables 3-1, 3-2 and 3-3 provide information concerning vegetation values and species characteristics in the seed mixes. The approved seed mixes are shown in Figures 10-2, 10-3, and 10-4.

Regional Land Use

Regional land use has been fully discussed in the U.S. Geological Survey's "Final Environmental Statement, Development of Coal Resources in Central Utah, Part 1- Regional Analysis" (1979).

In the seven-county region, Federal lands, including those of the National Forest and National Park systems, account for 76% of the land surface, while only about 7% was irrigated farm acreage. A current letter from the SCS states that there is no prime farmland within the original SCC permit area (see Figure 2-1).

The livestock industry, mostly cattle and sheep grazing, has been part of the region's historical economy. The timber industry has only a few small saw mills stll operating mostly to supply fence posts, and lumber.

Land Owner or Surface Manager Comments

SCA owns the small portion of land (approximately 320 acres) containing the refuse pile and slurry ponds which comprise the SCA Permit Area. A letter from the owner is included in Figure 4-3. This letter contains comments from David Pearce, a former Vice President of Sunnyside Cogeneration Associates, as to the proposed post-mine land use.

Mineral Ownership, Mines and Wells

Within the SCA Permit Area, there are not any operating mines nor are there any oil producing or gas wells.

Socioeconomic Considerations

Carbon County, with its low population density and isolation from Utah's urban centers, is historically an important coal-producing area in the State. The local economy is dependent upon conditions of the coal market.

Utah Department of Employment Security data indicates that in 1991, Carbon County had a total non-agricultural employment of 7,624 of which 4.03% were engaged in manufacturing; 17.14% in mining; 1.95% in contract construction; 5.72% in transportation, communications, and public utilities; 25.2% in trade; 1.82% in finance, insurance, and real estate; 26.55% in government and the remaining 17.58% in service related fields. Statistics also show that in 1988, the average monthly payroll wages for mining in Carbon County were $2,820.00 which are the highest of all the non-agricultural fields in Carbon County. This data is from the "1990 Statistical Abstract of Utah" and is included as Figure 4-2.

The SCA operations contribute a substantial share of employment, with the cogeneration operations and, indirectly, in other business. Its continued operation is of significant importance to the socioeconomic well being of the area.

Suitability and Compatibility

Land use during operation will continue to be as a fuel source for SCA's cogeneration facility and as a disposal site for coal mine waste including slurry as well as coarse or fine refuse. The effect of this operation on land

use is minimal and is not expected to change during the permit period. Industrial waste from the SCA cogeneration facility will not be disposed of in the SCA Permit Area, therefore these operations should have a minimal effect on the SCA Permit Area.

The final grading will be suitable for reclamation and revegetation and will be compatible with the natural surroundings and the approved postmining land use.

413 PERFORMANCE STANDARDS

Postmining land use will be the same as premining land use. The reclamation activities following mining are designed to allow the area to revert to the type of activity that occurred prior to mining. All disturbed areas will be restored in a timely manner to conditions that are capable of supporting land uses or higher or better uses.

The coke ovens which are located on the Northeast corner of the SCA Permit Boundary will be preserved by avoidance as recommended by the Utah State Historical Preservation Office. Operational activities and reclamation activities will be carried out such that they do not disturb the existing coke ovens.

The postmining land uses will be the same as the premining land uses. The postmining land uses will be practical and reasonable, they will be consistent withapplicable land-use policies or plans and they will not cause or contribute to violation offederal, Utah, or local law.

414 ALTERNATIVE POSTMINING LAND-USE REQUEST

Not applicable.

420 AIR QUALITY

421 THRU 423 AIR QUALITY PERMIT

SCA will continue its programs in the permit area to comply with the requirements of the Clean Air Act and other applicable air quality laws and regulations, as well as health and safety standards. SCA has not violated any air quality laws to date. A copy of the SCA's Air Quality Permit is included in Appendix 4-2. SCA will coordinate specific air quality needs with the Utah Division of Air Quality.

A weather station is located at the Sunnyside Town Hall, but no air quality monitoring devices are currently in use. Air pollution sources come from fugitive dust from the coarse refuse stockpiles and unpaved roads.

424 FUGITIVE DUST CONTROL PLAN

Effects of Mining Operations on Air Quality

Most of the region around the SCA Permit Area has been designated a Class II area for purposes of determining any significant amounts of air quality deterioration. Deterioration of the air quality is not expected during the permit period with the exception of short high wind periods when sand and smaller grained particles will be picked up outside of the SCA Permit Area and added to the air in the permit area.

The haul road used by the refuse trucks is unpaved. To control fugitive dust, roads will be maintained in accordance with SCA's Air Quality Permit (see Appendix 4-2) and as specified in Chapter Five, Sections 527 and 534.

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510 INTRODUCTION

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and the areas to which they drain. Also included are detailed maps and calculations showing the amount of water from each watershed and the capacity of the drainages and ponds that were constructed to contain them. In some instances, a drainage commencing within the SCA Permit Area may extend beyond the limits of the SCA permit boundary. An example of this is the outlet of the Pasture Sediment Pond. In such a case, SCA commits to maintaining this drainage and providing the necessary information to the Division to show its adequacy to handle the required storm event. In the event that this occurs elsewhere within the permit area, SCA will handle each instance on a case-by-case basis and notify the DOGM of any proposed changes to the Permit.

It should be noted that the SCA operations encompass a number of entities that do not necessarily lie or operate within the permitted area. These non-mining related activities that occur outside of the permitted area are done so in a controlled manner under permits from other agencies, and have been incorporated into the entire design and plan of the SCA Cogeneration facility. SCA understands the implications of utilizing entities outside of the permitted area and commits to maintaining the applicable areas in accordance with DOGM requirements.

This chapter includes operation plans, reclamation plans, design criteria, and performance standards that are applicable to the SCA Permit Area. Design calculations are referenced in the appropriate sections along with maps, plans, and cross-sections. It should be noted that SCA has relied on data, maps, plans, and cross-sections from previous approved permits for the SCC mines in order to verify locations of geologic structures, sediment ponds, borrow areas, road culverts, creeks, etc. that lie within the SCA Permit Area. In this chapter where the "permit area" is referred to, the SCA Sunnyside Permit Area is to be assumed unless the larger overall area for the SCC is specifically referred to in the text as the "original SCC permit area."

512 CERTIFICATION

512.100 Cross Sections and Maps

The maps and cross sections, associated with this permit, have been prepared and certified by, or under the direction of, a qualified, registered professional engineer or land surveyor, with assistance from experts in related fields such as hydrology, geology and landscape architecture. These maps and cross sections will be updated as required by the Division of Oil, Gas and Mining (DOGM).

A list of plates that are applicable to the SCA Permit Area as required under R645-301-512.100 through R645-301-512.260 are included in the General Table of Contents.

512.110 Mine Workings

No underground mine workings exist within the SCA Permit Area. Plate 5-7 delineates the extent of surface areas previously disturbed by mining activities. Plate 5-8 shows the existing surface and subsurface facilities and features which have been associated with mining activities.

512.120 Surface Facilities and Operations

Plate 5-1 shows the location and size of existing areas of spoil, waste, coal development waste, and non-coal waste disposal, dams, embankments, other impoundments, and water treatment facilities within the SCA Permit Area. It also shows the facilities used for crushing and screening the coal refuse as well as the features associated with the adjacent cogeneration facility.

Plate 5-5 shows topsoil pile cross sections.

512.130 Surface Configurations

As required under sections 542.300 and 302-200, maps or cross sections detailing plans for soil stabilization, compacting and grading are referenced in the appropriate sections.

512.140 Hydrology

Maps required under R645-301-722 and R645-301-731.700 are included in Chapter Seven, Hydrology. Among these requirements are locations of subsurface water within or adjacent to the SCA Permit Area, intakes for current users, sedimentation ponds, coal processing waste banks, and embankments. Maps are provided only when the above mentioned locations fall within the SCA Permit Area or within an adjacent area that will potentially impact the SCA Permit Area.

512.150 Geologic Cross Sections and Maps

Chapter Six, section 622, includes information applicable to the SCA Permit Area such as: elevations and locations of test borings and core samples; nature, depth, and thickness of coal seams; and crop lines and strike and dip of the coal.

512.200 thru 512.260 Plans and Engineering Designs

Plate 5-1 outlines the locations of excess spoil, durable rock fills, coal mine waste, impoundments and other surface facilities within and adjacent to the SCA Permit Area. Plate 5-2 outlines the locations of primary roads. The design of the Excess Spoil Disposal Areas is found in Chapter Nine and Appendices 9-2, 9-5, and 9-7. Coal mine waste will also be placed in the Excess Spoil Disposal Areas.

513 COMPLIANCE WITH MSHA REGULATIONS AND MSHA APPROVALS

513.100 thru 513.800 Compliance with 30 CFR

Coal mine waste dams, embankments, impoundments, sedimentation ponds, refuse piles, the extinguishing of coal mine waste fires, and the nature and timing of reclamation activities will meet the performance

standards set forth by the MSHA. The embankments and impoundments that are regulated by the MSHA are shown in Plate 5-4, Slope Stability Criteria Map. Where applicable, SCA will comply with all MSHA Regulations and obtain all required MSHA Approvals.

A geotechnical report prepared in February 1987 and updated in June 1992 by Rollins, Brown and Gunnell (Appendix 5-5) shows that the existing East and the former West Slurry Cell Embankments meet the requirements of 30 CFR 77.214 and 77.215. The cross-sections for this report are shown in Plate 5-6.

Coal mine waste fires will be extinguished by placing two-feet of borrow material over the burning area. Only those persons authorized by the Operator, and who are familiar with the appropriate procedures will extinguish any coal mine waste fires. The source of borrow material may be any of the borrow areas within the Permit Area where excess material exists beyond that needed for reclamation, or from spoil material removed during the mining process, or from an acceptable off-site source. When an area is mined, the fire control materials will be placed in the Excess Spoil Disposal Area.

514 INSPECTIONS

514.100 thru 514.140 Excess Spoil Disposal Areas

A professional engineer or specialist experienced in the construction of earth and rock fills will periodically inspect the fill throughout the construction period (at least four times a year) as required by the DOGM. These inspections will be performed during critical construction periods such as: foundation preparation, installation of final surface drainage systems, and the final graded and revegetated fill. A schedule for periodic inspections is provided in Table 5-1.

A certified report will be provided by the professional engineer promptly after each inspection. The report will include any appearances of instability, structural weakness, and other hazardous conditions as well as the results of samples taken to determine the acid/toxic potential. The report on the drainage system and protector filters will also contain color photographs taken in compliance with section 514.130 thru 514.133 that are representative of the site. Photographs will accompany each certified report and will include physical features of the site in order to specifically and clearly identify the site.

A copy of each inspection report will be retained at the SCA cogeneration power plant site and at the office of the Engineer. A copy of the inspection report will be promptly sent by SCA to the Division, as required.

514.200 thru 514.250 Refuse Piles

A professional engineer or specialist experienced in the construction of earth and waste structures will inspect the refuse pile on a regular basis (at least four times a year) as required by the DOGM. These inspections will be performed during critical construction periods such as: foundation preparation, placement of underdrains and protective filter systems, installation of final surface drainage systems, and the final graded and revegetated facility. A schedule of periodic inspections is provided in Table 5-1.

A certified report will be provided by the professional engineer promptly after each inspection. The report will include any evidence of instability, structural weakness, and other hazardous conditions. The report will also contain color photographs taken in compliance with section 514.240 that are representative of the site.
Photographs will accompany each certified report and will include physical features of the site in order to specifically and clearly identify the site.

A copy of each inspection report will be retained at the SCA cogeneration power plant site and at the office of the Engineer. A copy of the inspection report will be promptly sent by SCA to the Division, as required.

514.300 thru 514.330 Impoundments

A professional engineer, or other qualified person designated by SCA, will inspect the impoundments within the SCA Permit Area. Impoundments, subject to MSHA, 30 CFR 77.216, will be inspected in accordance with the MSHA Approved Program found in Appendix 5-8. Quarterly inspections will be conducted on impoundments NOT subject to MSHA, 30 CFR 77.216. The various impoundments and their classification are outlined in Plate 5-4. A schedule for periodic inspections is provided in Table 5-1.

After each inspection, the qualified registered professional engineer will provide a certified report that the impoundment has been constructed and maintained as designed in accordance with the R645-302 Rules. The report will include information necessary to satisfy regulations set forth under section 514.312. Such information will include discussion of instability, structural weakness or other hazardous conditions, depth and elevation of any impoundment waters, existing storage capacity, any existing or required monitoring procedures and instrumentation, and any other aspects of the structure affecting stability. A copy of the report will be retained at the SCA cogeneration power plant site and at the offices of the Engineer. A copy of the inspection report will be promptly sent by SCA to the Division, as required.

Appendix 5-1 presents the slope stability analyses for the Railcut, Pasture and Borrow Area Sediment Ponds. Appendix 5-3 presents slope stability analyses for the Clear Water Pond and the former Slurry Ponds One and Two. Appendix 5-4 contains information on slope stability for the Coarse Refuse Toe and Old Coarse Refuse Road Sediment Ponds. The above mentioned impoundments have been determined to be stable under existing conditions.

515 REPORTING AND EMERGENCY PROCEDURES

515.100 Slides and Other Damage

At any time a slide occurs which may have an adverse effects on public property, health, safety, or the environment, SCA will notify DOGM by the fastest available means and comply with remedial measures required by DOGM.

515.200 Impoundment Hazards

At any time there is a potential impoundment hazard, SCA will notify DOGM by the best available means. DOGM will be informed of the emergency procedures formulated for public protection and remediation.

515.300 thru 315.322 Procedures for Temporary Cessation of Operations

Before temporary cessation of excavation of the refuse pile or reclamation activities for a period of 30 days or more, or as soon as it is known that a temporary cessation will extend beyond 30 days, SCA will submit to DOGM a notice of intention to cease or abandon operations. It is understood by SCA that temporary abandonment will not relieve a person of their obligation to comply with any provisions of the approved permit. Regular monitoring and inspections will continue. Maintenance will occur if needed.

All surface facilities will be effectively secured in areas in which there are no current operations, but in which operations are to be resumed under an approved permit.

In the event of a cessation, regulations 515.321 and 515.322 will be addressed. A statement of the exact number of surface acres and the horizontal and vertical extent of subsurface strata which have been affected in the SCA Permit Area prior to such temporary cessation or abandonment, the extent and kind of reclamation of surface area which will have been accomplished, and identification of the backfilling, regrading, revegetation, environmental monitoring, and water treatment activities that will continue during the temporary cessation.

516 SLIDE PREVENTION

There are no underground mining operations within the SCA Permit Area, nor are there any exposed coal seams. Therefore, barriers for the purpose of slide prevention near coal seams will not be used within the SCA Permit Area.

520 OPERATION PLAN

521 GENERAL

The following sections contain plans, appropriate maps, cross sections, narratives, descriptions, and calculations in accordance with the requirements relevant to this section. Practices will be limited to excavation and handling of coal mine waste to segregate non-combustibles, and redisposing such materials in accordance with 301-536. SCA's operating plan for its adjacent alternative energy power plant is designed to substantially reduce the final quantity of waste materials which will ultimately remain within the existing refuse disposal area. Reclamation essentially commenced with the first ton of waste removed and used as an alternative energy fuel. Reclamation will be a continuous process over the life of the mine, ultimately grading, covering and revegetating any remaining non-combustible materials. Descriptions of these operations are included in the following sections as well as Chapter Nine, Mining Plan.

521.100 thru 521.190 Cross Sections and Maps

See Section 512 for a list of plates that are pertinent to fulfilling the requirements of this section.

521.200 thru 521.270 Signs and Markers Specifications

The location and details for Permit boundary, historic sites, disturbed area and topsoil stockpiles are shown in Plate 3-1, Pre- and Post Law Disturbance. All required signs and markers are in place and maintained in compliance with R645-301-521.200.

1. The signs and markers will be posted, maintained, and removed by SCA;
2. They will be a uniform design (so that they can be easily seen), be made of a durable material, and conform to local laws and regulations;

3. They will be in-place and maintained during all operation and reclamation activities; and

4. They will be retained and maintained until after the release of all bonds.

For the purposes of the operation and reclamation activities, perimeter markers will be used in compliance with the following rules and regulations:

1. The perimeter of all areas affected by surface operations or facilities before beginning reclamation activities will be clearly marked; and

2. The perimeter of the SCA Permit Area will be clearly marked before the beginning of surface reclamation activities.

For the purposes of the operation and reclamation activities, buffer zone markers will be used in compliance with the following rules and regulations:

1. Signs will be erected to mark buffer zones as required under R645-301-731.600 and will be clearly marked to prevent disturbance by surface operations and facilities; and

2. Buffer zones will be marked along their boundaries as required under R645-301-731.600.

Topsoil markers have been erected to mark where topsoil or other vegetation-supporting material is physically segregated and stockpiled as required under R645-301-234.

522 COAL RECOVERY

SCA's activities will maximize the use and conservation of the coal resource by gleaning the very least amount of heating value originally extracted from the coal measures. SCA will utilize the best technology currently available to incinerate coal mine waste in a fluidized bed combustion boiler, which will supply steam to generate over 50 MW of electrical energy. Fluidized-bed combustion has been approved as the best technology to maintain environmental integrity during this waste utilization activity.

Abandoned coal refuse piles are often times reactivated, and reprocessed to recover a marketable coal product. On some occasions, piles are reworked several times, using various processing approaches. SCA's activities will assure that no reworking of this pile occurs in the future, as the small amount of remaining materials will have been determined to be non-combustible. SCA's use of coal mine waste to generate electricity is consistent with our national energy policy to conserve our domestic energy resources.

523 MINING METHODS

SCA's activities will include excavation and handling of coal mine waste and redisposal of non-combustible materials within the SCA Permit Area. Approximately 410,000 tons per year of coal mine waste will be consumed by SCA. The fueling plan for the coal waste fired generator will require excavation of accumulated waste from the existing pile areas, beginning as early as January 1993, and continuing for approximately thirty years. Based on SCA's contract for the sale of electricity to Utah Power and Light, handling coal mine waste to serve as an alternative energy fuel will be a consistent and continuous process. Coal mine waste that continues to be generated by offsite preparation plants will also be factored into SCA's fueling strategy, which can allow direct acceptance of waste at the facility, or temporary placement within the refuse disposal area prior to utilization.

Detailed plans on excavation activities can be found in Chapter Nine, Section 9.6.

SCA will use a standard mobile fleet of excavation equipment which may include all or some of the following: dozers, front-end loaders, end-dump trucks, scrapers, back-hoes, and support equipment (water truck, maintenance vehicles). Excavation will be carried out in lifts, to assure continued stability of the refuse pile, while providing ability to segregate non-combustible materials as they are encountered. An advancing benched face working area will provide access to fuel along a face on each working layer. Sampling and testing will be a continuous process to insure that materials provided to SCA's cogeneration facility meet minimum levels of combustibility. Materials will be segregated as they are excavated for handling in one of three ways: 1) direct hauling to the power plant site, 2) redisposal within the SCA noncombustible waste site, or 3) handled through a static grizzly on the refuse pile to separate non-combustibles (rocks, metal, timbers, etc.). Any materials separated through the grizzly will be temporarily stored in piles until loaded and transported to the combustor or the refuse disposal area. The grizzly staging area will be relocated from time to time as excavation activities warrant, and will minimize accumulations of separated materials.

523.100 thru 523.220 Surface Coal Mining and Reclamation Operations Relating to Underground Mines

No activities related to the SCA Permit Area will be conducted closer than 500 feet of an underground or abandoned underground mine. This is reinforced by the fact that there are no underground or abandoned underground mines within 500 feet of the SCA Permit Area boundary.

524 BLASTING AND EXPLOSIVES

There will be no blasting or explosives used within the SCA Permit Area. Thus, regulations 524 through 524.800 are not applicable to this Permit Application and consequently are not addressed.

525 SUBSIDENCE

No material damage or diminution within the Permit Area will be caused by subsidence because no underground coal resources are available within the Permit Area which would cause subsidence. No past or future underground coal mining operations have or are likely to occur within the SCA Permit Area.

526 MINE FACILITIES

The following sections contain narratives explaining the construction, modification, use and maintenance of facilities that lie within the SCA Permit Area and are designated in sections 526.100 through 526.300.

526.100 thru 526.116 Mine Structures and Facilities

Surface and subsurface facilities and features which existed prior to January 21, 1981 are shown on Plate 5-8 existing surface and subsurface facilities and features. Existing surface features are identified on Plate 5-1 Surface Facilities.

SLURRY HANDLING and STORAGE

The **slurry ditch** was constructed in the 1950's, for the purpose of transporting coal processing waste in slurry form from the Sunnyside Mine wash plant to the disposal sites within the current SCA permit area. Surface drainage from the hillside north and east of the SCA permit area as well as the area between the railroad tracks was collected by the coal slurry ditch and could be routed with the coal fines through either Slurry Pond 1 or Slurry Pond 2 and then into the Clear Water Pond (see Plate 7-1).

Typically, during operation of the Sunnyside coal wash plant, one slurry pond was in use while the other was in either the drying or cleaning stages. Occasionally when both slurry ponds were being serviced, flows were diverted to the East Slurry Cell. With the cessation of operations at the SCC Wash Plant, slurry is no longer being transported to the SCA Permit Area. The purpose and use of the slurry ditch is now for collection and conveyance of surface runoff. The Excess Spoil Disposal Area #2 has been proposed to fill the area of the slurry ponds and clear water pond. This proposal includes additional maintenance to the slurry ditch (see Appendix 9-7). The ditch meets or exceeds the permanent program performance standards. It is of sufficient size to safely pass the design storm as calculated in Appendix 7-3.

The **West Slurry Cell** (formerly MSHA No. 1211-UT-09-02093-03) was located near the center of the permit area. The cell was constructed in the 1950's as a disposal site for fine coal refuse slurry. Wet slurry was last deposited in this cell in 1975 when the East Slurry Cell was put in operation. Since then, dry coal fines from other slurry cells as well as coarse refuse from the Sunnyside Mine have been placed in the cell. This area was actively mined by SCA during the first years of operations.
A dike was constructed of non-combustible earth materials across the existing wash to impound the slurry. This dike was subsequently covered with coarse refuse material to stabilize the west bank of the slurry cell in order to meet the permanent program performance standards under SMCRA. This dike material was excavated during the SCA operations. The West Slurry Cell has been excavated to the point where it no longer is considered an impoundment and has been decommissioned by MSHA. The area is now only

referred to as the Refuse Pile.

The **East Slurry Cell** is located adjacent to and on the east side of the former West Slurry Cell. The cell was constructed in 1974 primarily of coarse refuse material. The pond was constructed with a total capacity of 184 acre-feet. The East Slurry Cell is a temporary control structure with MSHA No. 1211-UT-09-02093-02. The structure is a temporary impoundment as addressed in R645-301-733. The structure is addressed by the MSHA criteria of 30 CFR 77.216(a). Storm runoff captured by the impoundment is allowed to evaporate or infiltrate. The SCA operations attempt to minimize the surface area from which precipitation runoff is allowed to flow into the East Slurry Cell.

The outer slopes of the east bank of the East Slurry Cell were reclaimed by the Sunnyside Coal Mine. SCA intends to excavate the suitable coarse refuse and the fine refuse from the cell in accordance with the mining plan outlined in Chapter Nine. Regular monitoring is conducted in accordance with the regulations for this structure. These monitoring reports are available at the mine site. See Appendix 7-3 for hydrologic calculations. This cell meets or exceeds the permanent program performance standards.

Slurry Ponds #1 and #2 were located near the northeast corner of the permit area. They were constructed during the 1970's to de-water the slurry from the Sunnyside coal wash plant. Fine refuse slurry material arrived from the coal preparation wash plant by way of the open slurry ditch. The ponds were designed to be used for de-watering, settling and filtration of the coal fines.

During typical, operations of the Sunnyside Coal Company's coal wash plant, one slurry pond was in use while the other was in either the drying or cleaning stages. Occasionally when both slurry ponds were being serviced, flows could be diverted to the East Slurry Cell and runoff did not go into the Clear Water Pond. Routine flow of the coal fines was manually controlled by the Sunnyside Coal Mine. The coal fines and sediment were allowed to fill to a maximum level that allows sufficient remaining volume in the pond to contain the design storm runoff.

The ponds were partitioned with a filter dike. The filter dike for Slurry Pond 2 was retro-fitted in 1993 with a filtering fabric to reduce the migration of coal fines into the Clear Water Pond. The water filtered through to an eight inch outlet pipe that routed it to the Clear Water Pond for further settling. The eight-inch pipe was the only outlet from the Slurry Ponds. The Slurry Ponds were primary sediment structures with the Clear Water Pond providing final treatment prior to discharge to the Icelander drainage. At no time did the slurry ponds discharge directly to the Icelander Drainage.

These two slurry ponds were temporary impoundments as addressed in R645-301-733. They were not addressed by the MSHA criteria of 30 CFR 77.216(a). They met the single channel spillway exemption of R645-301-743-132 by meeting the requirements of R645-301-742.225.2. **Slurry Pond #1** had a total record volume of 16.4 acre-feet (top of bank). **Slurry Pond #2** had a total record volume of 15.3 acre-feet (top of bank).

Regular monitoring is conducted in accordance with the regulations for these structures. These monitoring reports are available at the mine site. See Appendix 7-3 for hydrologic calculations. These ponds meet or exceed the permanent program performance standards.

The Excess Spoil Disposal Area #2 has filled the area of the slurry ponds and is approved to fill the Clearwater Pond (See Appendix 9-7).

The **Clear Water Sediment Pond** (UPDES 004), constructed during the 1970's and located near the

northeast corner of the permit area, is an off channel, temporary sediment control structure, with a total record volume of 4.86 acre-feet (top of bank). The structure is a temporary pond as addressed in R645-301-732.200. The structure does not meet the size or other qualifying criteria of the MSHA of 30 CFR 77.216(a). Therefore, it provides a combination of principal and emergency spillways that will safely discharge a 25 year, 6 hour event.

The primary discharge is through a perforated eight-inch stand pipe. An emergency open channel spillway at elevation 6530.08 can safely discharge the 25 year 6 hour storm. Two open channel inlets (riprap lined) enter the pond. Most storm runoff from the watershed has been routed to the East Slurry Cell and the main peak flows were not realized in the Clear Water Pond (see Plate 7-4).

The Excess Spoil Disposal Area #2 has been proposed to fill the Clearwater Pond (See Appendix 9-7).

Additional information concerning impoundments and slurry cells is available in Appendix 7-3. Other impoundments within the SCA permit site are also discussed in Section 526.300 Water Pollution Control Facilities as well as in Chapter 7 and Appendix 7-3. Regular monitoring of all impoundments is conducted in accordance with R645-514. These monitoring reports are available at the mine site and are submitted to the Division as required. All impoundments meet or exceed the permanent program performance standards.

COARSE REFUSE HANDLING and STORAGE

Construction of the **REFUSE PILE (MSHA ID Number 1211-UT-09-02093-01)**, which SCA is excavating, began prior to 1969. The western toe of the pile was extended to the west in the 1970's to provide a stable embankment for the West Slurry Cell that existed at the time and meet the permanent program performance standards. Additional refuse material was added to the top surface of the refuse pile by the Sunnyside Coal Mine as recently as 1994.

Plates 9-4 identify the location and extent of the coarse and fine refuse that has been deposited by the Sunnyside Coal Mine over the past decades and outlines the intended mining sequencing as SCA excavates the refuse usable as fuel for the adjacent power plant. The information used to create these mine sequencing plates comes from a study conducted by John T. Boyd Inc. and has been included in Appendix 9-1 of the permit as a reference.

Temporary storage areas are identified on Plate 9-2. These areas were approved by DOGM in 1993. They are adequately graded to provide surface drainage towards an approved diversion which flows to an approved sediment pond. These areas meet or exceed the permanent program performance standards.

Refuse Haul Roads are appropriately identified and classified on plates 5-2. They are graded and maintained to meet or exceed the permanent program performance standards. Transportation facilities are further discussed in Section 527. The south portion of the Old Coarse Refuse Haul Road, constructed by Sunnyside Mine in the 1970's, was reclaimed by SCA in 1994 (see Plates 10-2).

The **Crushing and Conveyance Structures** located at the north end of the permit area were constructed in 1992. The permit boundary was increased in 1994 to include these facilities. Plate 5-1 identifies the structures within the permit area as well as the adjacent cogeneration facility. A narrative description of the facilities is in Chapter Five. These facilities are maintained and operated to comply with the appropriate MSHA requirements and to meet or exceed the permanent program performance standards.

The **Excess Spoil Disposal Area** #1 (MSHA # 1211-UT-09-02093-04) is currently under construction and will continue to be constructed throughout the life of the cogeneration facility. This area west of the Refuse Pile was identified in 1993, for permanent disposal of excess spoil and coal mine waste. The permanent disposal area will be constructed and maintained to meet the permanent program performance standards. Regular inspections will be conducted in accordance with R645-301-514.

Foundation studies conducted have determined that the area is appropriate for this permanent disposal facility within the constraints of its design. Surface water is diverted around the disposal area. This site is not a slurry cell and large quantities of wet waste are not disposed of in the pile. No existing seeps or water sources were identified, therefore, concerns about acid leachate were determined negligible. Underdrains were determined to be unnecessary. See Plates 9-1, Chapter nine, and Appendices 9-2, and 9-5 for design criteria.

The Excess Spoil Disposal Area #2 has been proposed for construction in the northeast portion of the Permit Area. In essence, this small disposal area is designed to fill the two former slurry ponds and the Clearwater Pond with excess spoil and coal mine waste.

This permanent disposal area is proposed to be constructed and maintained to meet the permanent program performance standards. Regular inspections will be conducted in accordance with R645-301-514. See Plates 9-8, Chapter Nine and Appendix 9-7 for design criteria.

The temporary storage area west of the Pasture pond for **Non-Coal Waste** was identified in 1993. This area will be used as described in Chapter Nine for the temporary storage of non-coal waste until such time as the material can be disposed in an appropriate local landfill. The storage area will be maintained in accordance with the permanent program performance standards. The **Industrial Waste Dump**, utilized by the Sunnyside Mine since the 1970's, was closed and capped with 18 inches of clay material as described in Chapter nine. This former dump site is now used by SCA as Temporary Storage Area #2.

Topsoil was removed prior to all new surface disturbance and construction which commenced following enactment of laws requiring its protection. The topsoil is stored in stockpiles on the permit site. After the useful life of these area from which the topsoil was removed, the topsoil will be used to reclaim the area in accordance with the reclamation plan. All topsoil piles on the SCA permit area are appropriately identified and protected. They have been revegetated for interim soil protection, and adequate berms are in place to contain eroded sediment from the piles as calculated in Appendix 7-7. They meet the permanent program performance standards. See plates 5-5 for cross-sections and volumes of the stockpiles.

The **Revegetation Test Plots** (Sacco Flats Test Plots), located in the north-east portion of the permit site, were constructed by the Sunnyside Mine in the Fall of 1985. The SCA permit boundary was enlarged in 1993 to include the entire plots. These test plots are maintained to meet the permanent program performance standards. Annual maintenance includes items such as fence repair and other items identified as necessary.

526.200 thru 526.222 Utility Installation and Support Facilities

The only utilities within the SCA Permit Area are power lines which are shown in Plate 5-1. These power lines are maintained by Utah Power and Light. All operations will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by these UP&L electric lines.

Support facilities, of which there are currently none on-site, will be operated in accordance with a permit issued to SCA for the refuse disposal area. Plans and drawings for each support facility to be constructed, used, or maintained within the SCA Permit Area include a map, appropriate cross sections, design drawings, and specifications sufficient to demonstrate how each facility will comply with applicable performance standards. In addition to the other provisions of R645-301, support facilities will be located, maintained, and used in a manner that:

1. Prevents or controls erosion and siltation, water pollution, and damage to public or private property; and

2. To the extent possible using the best technology currently available - minimizes damage to fish, wildlife, and related environmental values; and minimizes additional contributions of suspended solids to stream flow or runoff outside the SCA Permit Area.

526.300 Water Pollution Control Facilities

The water pollution control facilities within the SCA Permit Area include sediment ponds and diversion ditches.

Sedimentation control ponds are used to store and/or treat water runoff from disturbed areas up to and including a 10-year, 24-hour event. Designs of the ponds and diversions are located in Appendix 7-3. Details (including design drawings and calculations) for all sediment control ponds and diversion ditches are included in Chapter Seven, Section 720.

All sediment ponds will be inspected as outlined for impoundments in Section 514.

Sediment removed from the ponds will be disposed of in the excess spoil area. If the material is to be used as a borrow material, the material will first be sampled and tested to verify its quality. Material to be reused as topsoil substitute must meet acceptable classifications according to the Table Two from the DOGM Guidelines for Management of Topsoil and Overburden and must comply with the Title V Coal Program Guideline for Disposal of Sedimentation Pond Waste, dated November 26, 1990. The operator will contact DOGM to receive approval of the location and the amount of material to be used. All impoundments meet or exceed the permanent program performance standards.

526.400 Air Pollution Control Facilities

SCA will continue its programs in the permit area to comply with the requirements of the Clean Air Act and other applicable air quality laws and regulations, as well as health and safety standards. A copy of the SCA Air Quality permit is included in Appendix 4-2.

Most of the region around the SCA Permit Area has been designated a Class II area for purposes of determining any significant amounts of air quality deterioration. Deterioration of the air quality is not expected during the permit period with the exception of short high wind periods when sand and smaller grained particles are picked up outside of the SCA Permit Area and added to the air in the permit area.

The haul roads used by the refuse trucks are unpaved. To control fugitive dust, roads around the main

complex which are being used by mobile equipment will be treated with calcium chloride, potassium chloride, or other acceptable biodegradable, organic wetting agents or sprayed with water as required during dry periods as required by SCA's Air Quality Permit.

NON-MINING RELATED ACTIVITIES

To comply with a requirement from the Utah Division of Air Quality, a small meteorological station was installed on the south ridge near the Excess Spoil Disposal Area (See Plate 5-1). The weather station was installed during the Summer of 1994 in connection with the non-mining related activities of the adjacent cogeneration facility. At the completion of the air monitoring study, this station maybe removed without prior approval of DOGM.

Terra-Tek, a drilling company, has been testing drill bits periodically since 1975 in an area in the western portion of the current SCA Permit Area. They generally drill to a maximum depth of about four feet. The area where drilling typically occurs is identified on Plate 5-1. Sunnyside Coal Company allowed Terra-Tek to conduct these non-mining related activities while the area was part of their permit. SCA will likely allow the drilling to continue until such time as it conflicts with the SCA operations. The Division was notified by letter dated March 17, 1993 of SCA's intentions regarding Terra-Tek.

527 TRANSPORTATION FACILITIES

The roads within the SCA Permit Area are shown on Plate 5-2. Also included on Plate 5-2 is a table showing widths, grades and lengths of each road within the SCA Permit Area. Plates 5-2C through 5-2J, excluding Plate 5-2I, include typical cross-sections for the roads and plan and profiles of each road.

Roads within the SCA Permit Area will be maintained during the permit period. Maintenance will consist of basic custodial care to control erosion, repair of structures and drainage systems, removal of debris from culverts and ditches, and replacement of road surface material as needed. Additionally, all unpaved roads being used by mobile equipment and other unpaved operational areas will be water sprayed and/or chemically treated as necessary to reduce fugitive dust as required by SCA's Air Quality Permit.

In the event of a catastrophic event, roads will be repaired as soon as possible after the damage has occurred. Furthermore, there are no plans to alter any natural drainage way, or make alterations involving a steep cut slope.

All transportation facilities will be properly maintained and then restored at the end of the cogeneration plant life to prevent damage to fish, wildlife, and related environmental values, as well as to prevent additional contributions of suspended solids to stream flow or runoff outside the SCA Permit Area. Appendix 5-7 includes a description of each road and structural stability calculations for the roadway embankments. Additional information on final reclamation of roads can be found in Chapter Ten. All transportation facilities meet or exceed the permanent program performance standards.

WASTE COAL HANDLING SYSTEM DESCRIPTION

The following sections discuss operations involving the use of the crushing facility. The crushing system utilizes the following units:

1. Waste coal receiving hopper (Truck Dump);

2. Transfer conveyors;
3. Primary and Secondary Crusher System;
4. Product Transfer/Stacking Conveyors/ Screen Station
5. Silo Storage/Transfer Conveyors; (Not in Permit Area)
6. Live-Storage Silos (Not in Permit Area).

The SCA Permit Area was enlarged to include the crushing units on May 16, 1994. The items 5 and 6 are not within the permit area. These facilities are associated only with the power plant operation and are not part of the mining process. The SCA crushing unit exists solely to appropriately size all material utilized in the SCA plant. This sizing is required regardless of the origination of the fuel. All material, whether it be run of mine ("ROM") coal or waste coal, will be run through the receiving hopper and crushed and sized accordingly.

It is anticipated that the SCA project may need to purchase six to seven thousand tons of ROM coal per year. This coal will typically be utilized when the waste fines have been frozen and are less accessible. There may be other circumstances when ROM coal will be utilized by the SCA facility.

Plate 5-1 shows the location of the crushing facility in relation to the SCA Permit Site. Material to be burned in the plant is run through the crushing and conveyor system and stored in the silos based on the B.T.U. values, etc. Then, material is fed from the silos through a conveyor system into the power plant and the boiler. The fluidized bed boiler requires material to be crushed to a certain specification. Therefore, it is important the SCA crushing unit size the material correctly.

The waste coal pile owned by SCA represents approximately 23 years of fuel supply on the ground. If the SCC mine were to cease operation today, SCA could be required to transport material to its site, either mixing ROM coal with its current waste coal supply to extend the life of the pile, or purchasing additional waste materials from other sites. All these materials must go through the crushing system that SCA has on site to meet boiler specifications for fuel.

It is important to know that no matter where material is obtained, whether it be from SCA's DOGM permitted area, ROM coal, or waste material from another site, this material is all directly fed into the waste coal receiving hopper and sized and crushed accordingly. SCA is not unique in this process. All coal fired power plants have crushing units on site to prepare fuel for boiler specifications.

The following paragraphs include a detailed description of the waste coal handling system for the SCA cogeneration facility.

The handling system provides for receiving Waste Coal from two independent sources, including screening the material according to size, with the oversize material being crushed to a 1/4" top size, and storage in segregated, enclosed silo systems, (1,800 tons total capacity), according to BTU content, (high or low), for reclamation in a proportioned blend by the plant operating system (provided by others).

The system also provides for: weighing incoming material as it is received, with printed record; removal of metals via electro-magnet, with backup metal detection of the final product; and, the ability to segregate crushed product into an open, dead-storage pile for emergency reclamation, if needed. Dust control features of the system include totally enclosed live-storage silos and transfer points, covered conveyor systems and a water-spray type dust suppression system at transfer points, as needed.

Waste Coal Receiving Hopper

Material from the Waste Coal piles will be received in an 100 ton capacity, ramped, drive-over Waste Coal Receiving Hopper designed with slope angles to ensure the flowability of wet, sticky coal.

The hopper slopes are lined with high molecular weight plastic sheeting ("slick sheet") to enhance flowability as well as to act as a replaceable wear surface. Air cannons are provided in the lower hopper walls to provide for flow activation for the fine pond material. The hopper is open, above grade, on one side to provide a "push-in slot" for receiving coal by dozer when needed.

Dust control is accomplished with a water-type suppression system to "fog" the hopper volume during unloading of dry gob materials.

Transfer Conveyors

Waste coal flows from the Waste Coal Receiving Hopper on a slow-speed, troughing conveyor (200 tph effective capacity) which feeds a transfer conveyor (250 tph effective capacity) that feeds the Primary Crusher. The Receiving Hopper conveyor belt is a heavy duty 3-ply belt to resist bruising and tears at this high impact point of loading.

A self-cleaning electro-magnet is mounted on the transfer conveyor to remove metals. A metal detector is mounted over the transfer conveyor downstream of the magnet as a protection element for the screening/crushing system. Additionally, a belt scale system (+ 1/4% accuracy) weighs all incoming material, with printed record.

Primary and Secondary Crushers

The Primary Crusher receives material from the transfer conveyor and sizes it to a nominal 1.5" size. Crushed material from the Primary Crusher is deposited on the next conveyor which then feeds the Secondary Crusher. Dust control for the Primary Crusher is a water-type suppression system.

The Secondary Crusher receives material from the Primary Crusher and sizes it to a nominal 1/4" size. A dust collection system is provided for the Secondary Crusher.

Product Transfer/Stacking Conveyors/Screen Station

Sized material from the Secondary Crusher flows onto a 36" Product Transfer conveyor (250 tph effective capacity) which transfers it to a 36" Radial Stacking Conveyor (250 tph effective capacity). The product is then conveyed either, to the Screen Station, to an open-pile for placement in dead storage, or to the Silo Storage Conveyor for transfer to the live-storage silos.

The single deck Screen Station separates the crushed product at 1/4". A 60" transfer conveyor takes the minus 1/4" product to the Transfer/Loader Hopper.

A 36" conveyor takes the plus 1/4" product from the screen to a temporary stockpile. This product is then transported to the Waste Coal Receiving Hopper (Truck Dump) to be reprocessed. A closed loop return conveyor transfers this material directly to be recrushed in the Secondary Crusher without the need for the temporary stockpile.

A 24" Transfer Conveyor and a 30" Radial Stacker transfer a portion of the screened product from the

Screen Station to an open pile for dead storage.

Dust Control for the Product Transfer and Stacking Conveyors and the Screen Station is a water-type suppression system and is applied as follows: immediately following the Secondary Crusher, at the transfer point between the 36" Product Transfer Conveyor and the 36" Radial Stacker, and at the outlet of the Screen Station.

The Transfer/Loader Hopper is mounted above the Silo Storage Conveyor. The Transfer/Loader Hopper is lined with slick sheet.

Silo Storage/Transfer Conveyors

The Silo Storage/Transfer Conveyors are located adjacent to the Permit Area and are associated with the power plant operation. The Silo Storage Conveyor is a stationary, troughing conveyor (250 tph effective capacity), which conveys product which has either been transferred directly from the Radial Stacking Conveyor, or reclaimed from the dead storage pile, to a transfer point on top of the first of three Live-Storage Silos.

Transfer points on top of each silo are semi-enclosed, with Y-gate chutes on the first two silos to direct the product into the silo, or onto the Silo Transfer Conveyors which connect to adjacent silos. The chute work is lined with slick sheet to enhance flowability.

Live-Storage Silos

The Live-Storage Silos are not located within the Permit Area. They are not associated with the mining operations. The three Live-Storage Silos are steel, totally enclosed cylindrical silos with cone hoppers (23,950 cubic feet total capacity each). Hopper angles are a minimum 60 degrees to ensure free flow of material during reclamation. A manually-operated, positive shut-off gate is included at the hopper outlet to provide for maintenance of adjacent mechanical equipment (to be provided by others).

Other silo features include bin level indicators and air-cannon flow activators. The silos are mounted with the outlets at the appropriate level, near grade, to provide for transfer of material by feeder systems onto the plant feed conveyor (to be provided by others).

528 HANDLING AND DISPOSAL OF COAL MINE WASTE

The applicability of Section 528 is related to handling of excess spoil and coal mine waste only. Details on the excavation of the coal mine waste can be found in Chapter Nine, Sections 9.6 through 9.7.

Excess Spoil Disposal Areas

Excess spoil will be placed in an Excess Spoil Disposal Area, designated on Plates 9-1A, 9-1B, 9-1C, and 9-1D or on Plates 9-8 A-D, in a controlled manner to ensure mass stability and prevent mass movement during and after construction. The disposal site will be designed and constructed to ensure that leachate and drainage from the area is controlled and does not degrade surface or underground water. Wastes will be routinely compacted and covered to prevent combustion and wind-borne waste. When the disposal is completed, a minimum of eighteen inches of soil cover will exist over the site and the site will be revegetated in accordance with the approved reclamation plan.

The Excess Spoil Disposal Areas will be inspected as required in Section 514.

Additional information concerning spoil disposal is outlined in Chapter Nine and Appendices 9-2, 9-5 and 9-7.

Slurry Ponds

Fine refuse from the SCC preparation plant was previously moved to dewatering or disposal areas by slurry transport in an open ditch. There were four slurry ponds within the SCA Permit Area: the West Slurry Cell, the East Slurry Cell, Slurry Pond One, and Slurry Pond Two. The East and West Slurry Cells were settling and evaporating impoundments that were constructed prior to or during 1974. Slurry Ponds One and Two were settling ponds. Presently, the SCC preparation plant is no longer in operation. Slurry Pond One and Slurry Pond Two have been filled in connection with Excess Spoil Area #2. The East Slurry Cell is storing slurry fines and receives surface runoff. The West Slurry Cell was excavated to the point that it no longer is an impoundment.

The West Slurry Cell was the first impoundment to be constructed for the disposal of slurry and coal mine waste in the late fifties to early seventies (Appendix 5-2). Coal mine waste and other waste was used as fill material to block a wash in the pediment material at the mouth of Whitmore Canyon overlooking the Icelander Drainage. Slurry from the preparation plant was transported to the impoundment by ditch for disposal. As the level of the slurry increased, additional coal mine waste was added to the top and sides of the impoundment. The present level of the slurry in the impoundment is over 200 feet above the bottom of the wash.

The East Slurry Cell was constructed in 1974 on the east side of the West Slurry Cell. Coal mine waste was placed and compacted in dikes. After the dikes were completed and covered with soil material, the impoundment was filled with slurry. After 1983, the impoundment was used as an overflow for the former Slurry Ponds One and Two.

Slurry Ponds One and Two were constructed in 1978 to the north of the East and West Slurry Cells. These ponds were constructed by excavating a depression in the colluvium at a gentle slope. Material from the depression was spread out down slope of the ponds for approximately 50 to 100 feet. Slurry Ponds One and Two were used in rotation. Slurry was introduced into a pond where it settled and was then filtered. During the use of the first pond, the second pond was decanted and the dried slurry removed by truck to the West Slurry Cell. After the second pond was cleaned, the cycle was reversed. If both ponds were in the drying and cleaning cycle, the slurry was diverted to the East Slurry Cell. Water from Slurry Ponds One and Two was discharged into the Clear Water Pond (UPDES Outfall #004) and then discharged to Icelander Drainage. The East is shown on Plate 7-12.

All surface drainage from the areas above the slurry ponds is diverted away from the embankments by diversion ditches designed to carry the peak runoff from 100-year, 6-hour precipitation event (Appendix 7-3). The diversion structures will be maintained to prevent blockage.

Visual inspections by a qualified registered professional engineer or a qualified MSHA impoundment inspector will be conducted according to 30 CFR 77.216-3 and/or R645-301-514.300 to assess the stability of the impoundments and determine the amount of seepage, if any.

Subsidence will not affect the ponds and embankments since the structures do not overlie the coal seam

and are located several miles west of the nearest outcrop. Mud flows, rock debris falls or other landslides are not expected to be a problem because the embankments are located at or above the level of the surrounding topography. Possibility of failure downhill of the embankments is limited to a thin layer of colluvial material on bedrock. Failure of this material would not threaten the embankments.

Coarse Refuse

Detailed cross sections and grades for the Coarse Refuse Pile and East Slurry Cell are shown in Plate 5-6. This plan shows the limits of the coarse refuse pile, as well as the slurry cell.

The coarse refuse disposal area is located on and is part of the west embankment of the former West Slurry Cell. The West Slurry Cell was constructed in the late 1950's to impound coal slurry from the Sunnyside mine's preparation plant. Coarse refuse material was added to the top and sides of the impoundment as the slurry level increased. The West Slurry Cell ceased being used as a settling pond in 1975 when the East Slurry Cell was built. Since that time, SCC continued to use the west embankment of the West Slurry Cell as the coarse refuse disposal area to stabilize the embankment and ultimately allow continued use of the West Slurry Cell.

The existing coarse refuse pile was built in lifts by leveling end dumped piles of material. The coarse refuse pile maintains a maximum 27 degree (2 horizontal:1 vertical) outslope and is terraced on 50-foot vertical increments. The terrace is a minimum 20-foot wide and is gently sloped to control surface water runoff and control erosion.

Geotechnical investigation of the West Slurry Cell embankments were conducted in 1984 and again in 1986. The 1984 work (Appendix 5-3) indicated that the West Slurry Cell embankment above the active coarse refuse disposal area was not stable with a static safety factor of 1.03. The study concluded that a safety factor of 1.46 would be obtained by maintaining maximum slopes of 2 (h) : 1 (v) and maintaining a moist compacted material density of 100 lbs per cubic foot. SCC continued stabilization of the west embankment by wheel compacting coarse refuse in lifts, maintaining 50-foot high benches at a maximum 2 (h) : 1 (v) slope, and establishing a minimum 20-foot terrace at every bench.

A 1986 report (Appendix 5-5) developed for a proposed coarse refuse pile expansion to the north of the existing coarse refuse pile, concluded a 2 (h) : 1 (v) slope between 50-foot high benches and terraces of 30-feet in width, while maintaining a moist compacted material density of 100 lbs per cubic foot provides an adequate factor of safety (greater than 1.5) under static conditions.

Cross-sections C-C', D-D', and E-E' (shown in Plate 5-6) indicate the coarse refuse pile embankment maintained the slope and bench criteria established in the geotechnical investigations. Recent in-place density testing (Appendix 5-6) indicated moist compacted densities greater than 100 lbs per cubic foot as established in the geotechnical investigations.

The coarse refuse pile will be in a state of ongoing excavation throughout the permit period. A side view of the coal mine waste excavation is shown in Figure 5-1. Excess spoil material and coal mine waste not suitable as fuel will be separated from the combustible material going to the Cogeneration Plant; transported and placed in a controlled manner in horizontal lifts not exceeding four feet in thickness; concurrently compacted as necessary to ensure mass stability and to prevent mass movement during and after construction; graded so that surface and subsurface drainage is compatible with the natural surroundings; and covered with topsoil or substitute material if required. The Excess Spoil Disposal Areas shown in Plates 9-1A, 9-1B, 9-1C, 9-1D, and 9-8 A-D..

All surface drainage from the area above the refuse pile will be diverted away from the fill into stabilized diversion channels designed to pass safely the runoff from a 100-year, 6-hour precipitation event. Calculations are found in Appendix 7-3.

The refuse pile will be inspected as outlined in Section 514.

Maintenance of the embankments will consist of filling and grading any erosion or other failure features discovered by the above inspections. Ditches on the terraces will be cleaned and graded as need warrants. Riprap in the drainage system will be repaired as needed.

Subsidence will not affect the refuse pile as the structure does not overlie the coal seam and is several miles west of the nearest outcrop. Mud flows, rock debris falls, or other landslides are not expected to be a problem. Possibility of failure near the sides and downhill of the refuse piles is limited to a thin layer of colluvial material on bedrock. Failure of this material would not threaten the refuse pile.

Burning and Burned Waste Utilization

Coal mine waste fires will be extinguished by covering the burning material with non-combustible material or by excavating burning or burned waste for surface extinguishing. Clean spoil available in the Excess Spoil Area or soil materials imported from off site may be used for fire suppression needs. Most areas of the refuse pile which are not within the active mining area have already been covered with non-combustible material to minimize the potential for coal mine waste fires. Therefore, it is not anticipated that significant quantities of materials will be needed for future fire suppression needs.

Only those persons authorized by the operator, and who have an understanding of the procedures to be used, will be involved in the extinguishing operations. No burning or burned coal mine waste will be removed from the permit disposal area without a removal plan approved by the Division. Consideration will be given to potential hazards to persons working or living in the vicinity of the structure.

Burned coal waste material encountered during excavation of the Coarse Refuse Pile will be disposed of in the Excess Spoil Pile.

Industrial waste

An industrial waste dump was located at the northeast end of the East Slurry Cell and the Refuse Pile in the refuse disposal area. The dump was constructed and used by excavating a trench, compacting the sides and bottom for a water barrier, and then covering the waste with a minimum of two feet of borrow material. It was closed as outlined in Chapter Nine.

529 MANAGEMENT OF MINE OPENINGS

529.100 thru 529.400 Mine Openings

There are presently no mine openings within the SCA Permit Area, nor are there expected to be in the future. Thus, the discussion of sealing or management of mine openings is not applicable and is not discussed in further detail.

530 OPERATIONAL DESIGN CRITERIA AND PLANS

531 GENERAL

The following sections include general plans for each sediment pond, water impoundment, coal processing waste bank, dam, and embankment within the SCA Permit Area. The SCA Permit Area is not threatened by subsidence of subsurface strata, therefore, the plans will not include discussions of this nature.

532 SEDIMENT CONTROL

The hydrologic design calculations for the sediment ponds are included in Appendix 7-3. These calculations outline the criteria, assumptions, and parameters used in order to design a structure that would be adequate to control sedimentation. Details are discussed in Chapter Seven, Hydrology, Section 740.

There is a system of collector ditches throughout the SCA Permit Area to collect runoff from roads and disturbed areas. These flow into sediment ponds that are located throughout the permit area. These ponds outfall into Icelander Creek tributaries, if they fill to their decant drains. The discharges are subject to the UPDES permit limitations discussed in Chapter Seven, Hydrology.

The permitted operations in the SCA Permit Area include excavations of the refuse piles, crushing the refuse and transportation of the refuse to the neighboring power plant site. The probable hydrologic impacts are expected to change very little with the inclusion of the excavation activities. The disturbance of the refuse piles caused by the excavation may increase sediment yield from these areas. The control of the extra sediment is discussed in Chapter Seven, Hydrology, Section 730.

533 IMPOUNDMENTS

See Sections 514 and 528.

534 ROADS

534.100 thru 534.340 Road Requirements

A maintenance plan for all unpaved roads is outlined below and is in accordance with requirements of both DOGM and the Division of Environmental Health. In the event that existing roads are retained under an approved post-mining land use, maintenance will continue as outlined in this section and section 527. The only post-mining land use plans for some existing roads within the SCA Permit Area are to allow occasional access to existing easements through the Permit area. These roads are identified on the Reclamation Plans.

All unpaved roads and other unpaved operational areas which are used by mobile equipment will be water sprayed and/or chemically treated to reduce fugitive dust as required by SCA's Air Quality Permit. A copy

of SCA's Air Quality Permit is located in Appendix 4-2.

535 SPOIL

The disposal of spoil material is outlined in Chapter Nine.

536 COAL MINE WASTE

536.100 thru 536.900 Coal Mine Waste Disposal

See Section 528 and Chapter Nine, Sections 9.6 and 9.7.

540 RECLAMATION PLAN

541 GENERAL

See Chapter Nine, Mining Plan for details on contemporaneous reclamation. Chapter Ten, Reclamation Plan includes details on final reclamation. Reclamation cost estimates are detailed in Chapter Eight, Bonding.

542.400 Abandonment

Before abandonment of the SCA Permit Area or before seeking final bond release, SCA will ensure that all temporary structures were removed or reclaimed and that permanent structures have been maintained properly and meet the requirements of the reclamation plan.

542.500 Sediment Ponds and Ditches

All sediment ponds, mine water discharge ponds, and ditches no longer needed when the reclamation of the disturbed areas is completed will be re-contoured and revegetated.

542.600 Roads, Culverts, and Bridges

All roads not needed to provide access to the easements crossing the Permit Area, and associated structures will be reclaimed. The culverts will be dug up, removed, and disposed in an approved landfill or otherwise abandoned by filling the culvert to reduce the potential of piping. The roads and their ditches will be ripped, contoured and revegetated.

542.700 Final Abandonment of Disposal Area

Following the excavation of the coal mine waste the remaining material will be regraded to approximately re-establish the surface contours that existed before mining operation disturbances. Revegetation efforts will be initiated following the excavation and regrading activities. See Chapter Nine, Mining Plan for details on contemporaneous reclamation. Chapter Ten, Reclamation Plan includes details on final reclamation.

550 RECLAMATION DESIGN CRITERIA AND PLANS

Approximately 75 percent of the disturbed portions of the SCA Permit site was originally disturbed prior to the current reclamation laws. Plate 5-7 identifies the previously-mined areas.

See Chapter Nine for contemporaneous reclamation details. See Chapter Ten for final reclamation details.

560 PERFORMANCE STANDARDS

Coal mining operations will be conducted in accordance with this permit as approved and with the performance standards of the permanent program.

Primary Roads

- Graded to a minimum side slope of 2%.
- Minimum six-inch cut ditch to collect drainage.
- Dust control techniques actively applied on roads being used by mobile equipment as needed to meet the requirements of the approved Air Quality Permit issued by UDEQ.

Ancillary Roads

- Graded and maintained to adequately serve the purpose of providing access as needed.

Sediment Ponds

- Operated and maintained to protect against any discharge which exceeds the limits set by the approved UPDES Permit issued by UDEQ.
- Periodically monitored, and sampled if needed, as required by the UPDES Permit.
- Sediment level will not reach an elevation higher then the inlet to the decant drain pipe.
- Sized adequate to contain and/or treat the 10-year, 24-hour precipitation event.
- Side slopes not steeper than 2H:1V.
- Spillway adequately clean and clear from sediments or debris to allow safe discharge of the 25-year, 6-hour precipitation event.

Topsoil Storage

- Adequate berm maintained to contain and/or treat runoff from the 10-year, 24-hour precipitation

event.

- Cross-sectional storage area between the berm and the stockpile not less than the minimum required in Appendix 7-7.
- Rills and/or gullies deeper than 9-inches will be filled, graded, or otherwise stabilized.

Siltation Fences

- Filter fabric embedded into the ground at least 6-inches.
- Fence post embedded adequately to provide stability.
- Fencing material adequately attached to the filter fabric and to the fence posts to provide support to the fabric.

Straw Bales for Sediment Control

- Adequately installed and maintained to direct runoff through the bale rather than allowing flows around or under the bale.

- Deteriorated bales shall be replaced or supplemented with an additional bale if the area being treated still requires additional sediment control.

Diversions/Culverts

- Side slopes no steeper than 2H:1V.
- Of adequate cross-section to safely pass the design storm without overtopping the banks or floodplain.
- If extensive erosion or siltation occurs which inhibits the diversion or culvert from passing the design storm or which contributes excessive sediment to the receiving storm, maintenance will be provided. This maintenance may include excavating or shaping the diversion to line, grade and cross-section to meet the design criteria specified in Chapter 7.

TABLE 5-1
INSPECTION SCHEDULE FOR THE EXCESS SPOIL PILE, REFUSE PILE AND ALL IMPOUNDMENTS

TABLE 5-1
INSPECTION SCHEDULE FOR THE EXCESS SPOIL DISPOSAL AREAS, REFUSE PILE AND ALL IMPOUNDMENTS

AREA TO INSPECT	ACTION REQ'D	FREQUENCY	REGULATION #
Excess Spoil Disposal Area #1 (Noncombustible Waste Site)	1	Quarterly[4]	R645-301-514.110 30 CFR 77.216
Excess Spoil Disposal Area #2	1	Quarterly	R645-301-514.110
Refuse Pile	1	Quarterly	R645-301-514.220
Pasture Pond	2	Quarterly	R645-301-514.330
Coal Pile Sediment Pond	2	Quarterly	R645-301-514.330
Old Coarse Refuse Road Pond	2	Quarterly	R645-301-514.330
Coarse Refuse Toe Pond	2	Quarterly	R645-301-514.330
Rail Cut Pond	2	Quarterly	R645-301-514.330
Borrow Area Pond	2	Quarterly	R645-301-514.330
Clear Water Pond	2	Quarterly	R645-301-514.330
East Slurry Cell	2, 5	Monthly	R645-301-514.320 30CFR77.216-3
East Slurry Cell	3, 5	Annually[4]	30CFR77.216-4

1. Inspect for appearance of instability, structural weakness, and other hazardous conditions.
   NOTE: These inspections will be performed during critical construction periods such as: foundation preparation, placement of underdrains and protective filter systems, installation of final surface drainage systems, and the final graded and revegetated facility.
2. Inspect for appearance of instability, structural weakness, and other hazardous conditions, depth and elevation of any impounded waters, existing storage capacity, any existing or required monitoring procedures and instrumentation and any other aspects of the structure affecting stability.
3. Describe any changes in the geometry of the impounding structure; instrumentation; average and maximum depths and elevations of the impounded water, sediment or slurry impounded; and any other aspect of the impounding structure affecting its stability.
4. Annual reports will be submitted to the MSHA district manager.
5. Impoundments meeting the criteria specified on 30 CFR 77.216 shall comply with the MSHA-Approved Program for Impoundment Inspections (PAP Appendix 5-8).

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The strata and coal seams generally dip north and eastward away from the outcrop at 5° to 8°. Several faults with displacements from 3 to 20 feet trend N 25° W across the worked out area. The cover varies from 200 feet in the Raise area to over 2,000 feet in the longwall areas. Rugged topography and high relief create a marked difference in cover thickness within a few hundred feet horizontally.

Local Geology of SCA Permit Area

As previously discussed, only the Mancos Shale and Quaternary Alluvium crop out within the SCA Permit Area. Much of the SCA Permit Area is covered by the actual coal mine waste. The locations of cross sections in the SCA Permit Area are presented in Plate 6-1. Plates 6-4, 6-5, and 6-6 present geologic cross sections through parts of the SCA Permit Area.

According to the Hydrogeologic Map (Plate 6-2), no faults were mapped within the SCA Permit Area. It is assumed that beds of the Mancos Shale follow regional strike and dip as discussed above.

624.110-130 Cross Sections, Maps, and Plans and Geologic Literature and Practices

The cross sections, maps, and plans required for the SCA Permit Area are listed in the General Table of Contents. Impacts on other areas of the Sunnyside Coal Mine Company's mining operation are not addressed.

624.200 Removal of Strata for the Purposes of Surface Coal Mining and Reclamation Activities

UNDERGROUND COAL MINING will not take place within the SCA Permit Area. However, for purposes of this permit application, the removal of the coal mine waste to the cogeneration plant is considered to be Surface Mining of Coal Mine Waste.

624.210 Lithologic Characteristics

Exploratory borings were drilled through the refuse pile within the SCA Permit Area in an effort to obtain data on lithology and thickness of the coal mine waste (see Appendices 6-1, 6-2, and 9-3). Boring logs that show the lithologic characteristics of the refuse pile within the SCA Permit Area are included with the reports presented in Appendices 6-1, 6-2 and 9-3.

The refuse pile consists of slurry pond refuse, up to 35 feet in thickness, and coarse and fine coal mine waste, up to 182 feet in thickness. Analyses of the coal mine waste are included in tabulations 1 through 4, which are included in the report in Appendix 6-1.

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710 THRU 712 INTRODUCTION

The refuse disposal area, previously created by the Sunnyside Coal Company (SCC), has been acquired by Sunnyside Cogeneration Associates (SCA) to serve as a long-term supply of waste fuel for its coal mine waste-to-energy facility, located adjacent to the SCA Permit Area. SCA's alternative energy project has been approved by the Federal Energy Regulatory Commission as a Qualifying Facility, based on the usage of coal mine waste as fuel in its fluidized-bed combustion boiler. SCA will use "active waste" from-off-site processing plants/refuse piles, "accumulated waste" from refuse piles, and other alternate fuels as sources of waste fuel for the facility. SCA's fueling plan will require excavation of coal mine waste from the existing refuse pile, which began as early as January 1993.

Based on SCA's contract for the sale of electricity to Utah Power and Light, handling coal mine waste to serve as an alternative energy fuel will be a consistent and continuous process. Coal mine waste that continues to be generated by off-site preparation plants will also be factored into SCA's fueling strategy, which can allow direct acceptance of coal mine waste at the facility, or temporary placement within the refuse disposal area prior to utilization.

SCA will excavate coal mine waste from the refuse disposal area based on sampling and analyses and a materials handling plan which will be periodically updated by SCA. Excavation of the coal mine waste will be considerate of material quality, pile and embankment stability, and mine operation. Over the life of SCA's facility, nearly all of the coal mine waste will be burned to generate electricity. Final reclamation of the refuse pile will be accomplished after all of the coal mine waste is either burned as a fuel, or repositioned within the refuse disposal area for final disposal, if determined to be unacceptable fuel material (i.e., ashes, rock, soil, etc.).

The information in this chapter includes hydrologic resources (both surface and groundwater), proposed operations and potential impacts on hydrology, methods and calculations used in hydrologic design. Performance standards and reclamation activities are discussed in Chapter Nine and Ten.

Cross sections, maps, plans, and analytical data included in this chapter have been taken from previous applications for the SCC mines on file at the Utah Division of Oil Gas and Mining (DOGM); or from previously issued reports prepared by other consultants. As such, the appropriate cross sections,maps, and plans were certified by the authors. It should be noted that SCA has compiled and relied on data and maps from previous approved permits for the SCC mines. The hydrology section has been appended to reflect the SCA Permit Area. In this chapter where the "permit area" is referred to, the SCA Sunnyside Permit Area is to be assumed unless the larger overall area for the SCC is specifically referred to in the text as the "original SCC permit area."

Currently, there are activities that occur outside the Sunnyside Cogeneration Associates Permit Boundary that have significant bearing on the operations of the SCA Cogeneration facility and the SCA Permit Area. These activities occur in conjunction with the SCA permit site.

In order for SCA to acquire the quality and quantity of fuel for the cogeneration facility, coarse or fine refuse materials maybe accepted from off-site facilities as needed. The refuse is stockpiled in designated areas within the SCA permit site then mixed with existing refuse on the SCA permit site and transported to the cogeneration facility. These operations; acceptance of refuse from off-site facilities and the transporting of coarse refuse to the cogeneration facility, require access roads that extend beyond the limits of the SCA permit boundary.

In addition to the access roads mentioned above, there are access roads to the south of the SCA permit boundary that are utilized for the purposes of the SCA operations. These roads are utilized to access areas of the SCA permit site that are inaccessible from the north side of the permit area. They are used by authorized contractors of SCA for the purposes of such activities as: water quality monitoring, periodic inspections, and site maintenance as needed.

Activities that occur outside the SCA Permit Area also include watersheds outside the permit area that drain into contained areas within the permit area. Chapter Seven of the Permit outlines these watersheds and the areas to which they drain. Also included are detailed maps and calculations showing the amount of water from each watershed and the capacity of the drainages and ponds that were constructed to contain them. In some instances, a drainage commencing within the SCA Permit Area may extend beyond the limits of the SCA permit boundary. An example of this is the outlet of the Pasture Sediment Pond. In such cases, SCA has provided the necessary information to the Division to show its adequacy to handle the required storm event. All disturbed area runoff is diverted into approved sediment ponds. In the event that this occurs elsewhere within the permit area, SCA will handle each instance on a case-by-case basis and notify the DOGM of any proposed changes to the Permit.

It should be noted that the SCA operations encompass a number of entities that do not necessarily lie or operate within the permitted area. The non-mining related activities that occur outside of the permitted area are done so in a controlled manner, under permits from other agencies, and havebeen incorporated into the entire design and plan of the SCA Cogeneration facility. SCA understands the implications of utilizing entities outside of the permitted area and commits to maintaining the areas in accordance with applicable requirements.

713 IMPOUNDMENT INSPECTIONS

There are eight existing impoundments within the SCA Permit Area which have been, and will continue to be used during the operation and reclamation periods. These impoundments will control sediment from SCA's refuse excavation activities. The impoundments are described in sections 732 and 733. All impoundments will be inspected quarterly for structural stability and proper performance by a qualified individual, in accordance with R645-301-514.300, as required in regulation 713. A copy of the inspection report will be promptly sent by SCA to the Division, as required.

720 ENVIRONMENTAL DESCRIPTION

721 HYDROLOGIC RESOURCES

This section of the Permit Application describes the groundwater and surface hydrology for the SCA Permit Area, and adjacent areas. Cross sections and maps showing the locations of subsurface and surface hydrologic features are described here, and are found in the exhibits of this chapter. The locations of monitoring stations used to gather baseline data on water quality andquantity are provided in these maps.

Groundwater has been encountered in the permit area on a limited basis. The various drilling records discussed in Chapter Six do not indicate the presence of groundwater in any ofthe holes drilled in the SCA Permit Area. This includes some holes over 200 ft deep, which reach the bed rock.

The only perennial surface stream within the SCA Permit Area is Icelander Creek. Grassy Trail Creek, which drains Whitmore Canyon, is a perennial stream which flows through the area immediately north of the SCA Permit Area. Tributaries to Icelander Creek flow around both the northwest and the south borders of the SCA Permit Area. The surface water hydrology is discussed in greater detail in various sections of this chapter.

A more detailed description of surface and groundwater hydrology is found within Section 722 with water quality issues being discussed in Section 724.

722 CROSS SECTIONS AND MAPS

A list of plates that are applicable to the SCA Permit Area are included in he General Table of Contents.

722.100 Location and Extent of Subsurface Water

As discussed in Section 721, drilling records of the SCA Permit Area show that little groundwater was encountered in the holes drilled in the SCA Permit Area. This includes drill holes over 200 ft. deep and into bedrock.

722.200 Location of Surface Water Bodies

The natural surface streams in and adjacent to the SCA Permit Area include Grassy Trail Creek (north of the SCA Permit Area) and Icelander Creek tributaries (border the northwest and southern portions of the SCA Permit Area). No water from Grassy Trail Creek enters the permit area, and no water from the SCA Permit Area discharges into it. Therefore, Grassy Trail Creek is not discussed further in this chapter.

West of the northern portion of the SCA Permit Area is a spring which feeds Icelander Creek. The location of this spring is shown in Plate 7-2. It is labeled by its monitoring station number, F-2.

The SCA Permit Area has been used as the refuse disposal area for the SCC mines for many decades. Sedimentation ponds have been constructed in the area, with collector ditches, to control runoff sediment from the roads and disturbed areas.

The locations of all the water bodies mentioned aboveare shown on Plate 7-1. All water bodies mentioned above, except Grassy Trail Creek, are discussed in more detail in various sections of this chapter.

722.300 Location of Monitoring Stations

The Surface and Groundwater Monitoring Locations are shown on Plate 7-2. The locations of UPDES water monitoring sites are shown separately on Plate 7-1.

722.400 Location of Water Wells

There is only one water well within a 1-mile radius of the SCA Permit Area. It is located north of the western portion of the permit boundary near the railroad tracks. The well location is shown in Plate 7-2. This well is certified as having a 200 ft collection gallery which begins at the bottom of a 42' concrete sump. The water right is described in section 724.100.

722.500 Contour Maps

The contours of the SCA Permit Area are shown in Plate 7-1. The topography of the area is also shown in cross sections AA', BB', and CC', (Plates 6-4 through 6-6). Cross section locations are shown in Plate 6-3.

723 SAMPLING AND ANALYSIS

All water quality analyses and sampling will be performed according to the methodology set forth in the current edition of "Standard Methods for the Examination of Water and Wastewater" or according to the methodology in 40 CFR Parts 136 and 434.

724 BASELINE INFORMATION

724.100 Ground Water Information

An underground water rights search showed one appropriated water well in the area adjacent to the SCA Permit Area. The water rights are held by East Carbon City, but will be used by SCA in the cogeneration facility pursuant to a contract. The certificate of appropriation is shown in Figure 7-1. The search was conducted on a 1-mile radius around the south quarter corner of section 6, T 15 S, R 14 E. The results of the water rights search are shown in Figure 7-2.

There is a spring approximately 1/4 mile west of the SCA Permit Area. This spring and the East Carbon City well are both shown in Plate 7-2. The spring, labeled F-2, flows into Icelander Creek, and becomes subject to the water rights and irrigation uses of Icelander Creek. This spring is also the subject of a contract between East Carbon City and SCA. The water from the spring will be used in the cogeneration facility. Baseline water quality data is found in Appendix 7-4.

The historic Coarse Refuse Seep emerged near the toe of the existing Coarse Refuse Pile. This seep was the subject of a special study conducted (1994-1995) by SCA in coordination with DWQ. The operations of SCA are expected to have a net improvement on the water quality in this area.

724.200 Surface Water Information

Icelander Creek

Tributaries to Icelander Creek are found near the northwest and southern boundaries of the SCA Permit Area. One tributary lies just outside of the northwestern border, another tributary cuts in and out of the southern border. The Utah Division of Water Quality has classified Icelander Creek as 3C (protected for non-game fish and other aquatic life, including the necessary organisms in their food chain), and 4 (protected for agricultural uses including irrigation of crops and stock watering).

Drainage and Sediment Control System

There is a system of collector ditches throughout the area to collect runoff from roads and disturbed areas. These flow into the sedimentation ponds found periodically around the permit boundary. These ponds outfall into the previously mentioned Icelander tributaries, if they fill to their decant drains. The discharges to the Icelander drainage must be adequate in quality to be suitable for the irrigation uses downstream. The discharges are subject to the UPDES permit limitations discussed later in this chapter. Alternate Sediment Controls may be placed as needed to improve erosion control.

The sedimentation ponds are described as follows:

Outfall No.	Location	
004	Clear Water Pond Lat: 39° 32' 52" Long: 110° 23' 11"	Surface runoff discharged from sediment ponds to Icelander Creek.
007	Rail Cut Pond Lat: 39° 32' 14" Long: 110° 23' 48"	Surface runoff discharged from sediment ponds to Icelander Creek.
008 sediment	Old Coarse Refuse Pond Lat: 39° 32' 20" Long: 110° 23' 03"	Surface runoff discharged from ponds to Icelander Creek.
009	Pasture Pond Lat: 39° 32' 36" Long: 110° 23' 58"	Surface runoff discharged from sediment ponds to Icelander Creek.
012	Coarse Refuse Toe Lat: 39° 32' 28" Long: 110° 23' 58"	Surface runoff discharged from sediment ponds to Icelander Creek.
014	Coal Pile Sediment Pond Lat: 39° 32' 38" Long: 110° 23' 32"	Sedimentation Pond to contain runoff from the crushing areas. Discharge to Icelander Creek.
016	Borrow Area Pond Lat: 39° 32' 25" Long: 110° 23' 45"	Sedimentation pond containing runoff from soil borrow area. Discharge to Icelander Creek.

The Surface and Groundwater Monitoring Locations shown on Plate 7-2 and listed in Appendix 7-8 on Table 7-2A were monitored for two years (June 1993-1995) according to the Baseline parameters listed in Table 7-2B. This baseline data has been analyzed and incorporated into Appendix 7-4.

The baseline data presented in Appendix 7-4 appears to indicate the following attributes:

- The decreased flows and temperature and the increased pH at the Coarse Refuse Seep Monitoring sites indicate that previously alleged flows through the refuse pile from slurry dewatering in the East Slurry Cell have either ceased or have been substantially reduced to a negligible amount.

- The stiff diagrams for the Coarse Refuse Seep monitoring sites indicate that the CRS, CRC, and CRB have similar water quality characteristics. They are rich in sulfate, magnesium, and calcium. The similarity of the stiff diagrams for the Coarse Refuse Seep monitoring sites deserves comment. Even though a significant increase in flow occurs between the CRS and the CRB, there is not a significant reduction in sulfate, magnesium, calcium or in the level of TDS. It is generally accepted that the increased flows near the boundary are not related to the refuse pile. Therefore, since those increased flows have

similar water qualities, it is likely that the earlier increases in flows are also not related to the refuse pile. The inability to find water during the exploratory drilling of the refuse pile in August 1995, supports the theory that water is not flowing through therefuse pile and causing the coarse refuseseep.

- The stiff diagrams for the Dragerton Well, Icelander Creek and F-2 Whitmore Spring monitoring sites indicate that they have similar water quality characteristics. They have a balanced chemistry of Sodium and Sulfate and moderate amounts of Magnesium. The close similarities lend support to the concept that these water sources are connected (water flowing through the surface alluvium is sampled at the well, comes to the surface at Whitmore Spring and flows into Icelander Creek). These stiff diagrams also indicate that Icelander Creek has not been significantly affected by the characteristics (such as higher sulfates) at the Coarse Refuse Seep.

- The Total Dissolved Solids (TDS) of CRS, CRC and CRB samples was much higher than at the Dragerton Well, Icelander Creek and F-2 Whitmore Spring. High TDS is a common attribute of water flowing through mancos shale formations as suspected of the water at this seep. These characteristics lend support to the concept that the low TDS water sites are connected and do not flow through mancos materials, but seep water flows through mancos type materials prior to surfacing.

The water quality data shows that previous discharges from station 004 (Clearwater Pond) generally met the limitations of the UPDES permit. The sediment ponds do not generally have discharge.

There are a few disturbed areas within the permit area that do not report to a sediment pond. Alternate Sediment controls provide water treatment asdescribed in Appendix 7-7.

724.300 thru 724.320 Geologic Information

The geology of the surrounding areas described in detail in section R645-301-624. In summary, the SCA Permit Area consists of alluvial fan deposits overlying pediment deposits, which overlay a deep Mancos Shale layer. The Mancos Shale is exposed along the southern border of the permit area. The combined alluvium and pediment deposits range from in thickness from a few feet to about one hundred feet. This natural geology has since been overlaid with refuse in several areas of the SCA Permit Area.

There has been very little groundwater encountered in the SCA Permit Area drilling explorations, and consequently the proposed operations are projected to have a negligible effect on groundwater. The operations will not affect the surface water quality. The proposed excavations will be designed such that the existing and sedimentation ponds will not be disturbed.

724.400 thru 724.410 Climatological Information

A statement of climatological factors which are representative of the SCA Permit Area are included in sections 724.411 thru 724.413. These factors include estimates of average precipitation, prevailing winds, and seasonal temperature ranges. Climate averages and data were obtained from The Utah Climate Center at Utah State University. The data tables are found in Appendix 7-2. The measurements were made at the Sunnyside mine weather station, which operated from 1984 thru 1988, and at the Sunnyside City Center station which has operated since 1989. The averages reported here are from the five years of data measured at the Sunnyside mine station.

724.411 Average Precipitation

The average annual precipitation for the Sunnyside area is 15 inches. The rainfall amounts are fairly evenly distributed from March to November, averaging 1.4 inches per month. The total snowfall accumulations average 41 inches per winter. Snow can begin in October and can continue through April.

724.412 Average Wind Direction and Velocity

The Utah Weather Guide estimates that the wind velocities, in the area of the Price weather station, average 3.3 miles per hour for an entire year. March and April have the highest wind averages. The average velocity for these months is 5 miles per hour for the entire month. No prevailing wind direction is listed in the Weather Guide.

724.412 Seasonal Temperature Ranges

The hottest month in the Sunnyside area is July. The average maximum temperature for a day in July is 82°F, the average minimum temperature is 54° F. The coldest month is January, with an average daily maximum of 33° F, and an average daily minimum of 12.9° F.

724.420 thru 724.500 Additional Information

No additional or supplemental information has been requested by DOGM at this time.

724.600 Survey of Aquifer Recharge Lands

Groundwater aquifers have not been encountered in the SCA Permit Area. The drilling records presented in Chapter Six, Geology, suggest that if an aquifer does exist, that it is deep in the Mancos Shale layer, or lower. The proposed operations will therefore have negligible effect on groundwater aquifers.

724.700 Alluvial Valley Floor Determination

The following discussion demonstrates that the SCA Permit Area and the downstream areas receiving discharge from the SCA Permit Area are not appropriately classified as alluvial valley floors. The proposed operations should therefore not be subject to the special requirements of R645302.320.

Statutory language specifically excludes "upland areas" for consideration as alluvial valley floors [P.L. 95-87, 701(1)]. The areas to be excluded from consideration include the upper portion of alluvial fans, pediment surfaces, etc. Areas underlain by bedrock and covered with residual weathered material and debris deposited by sheet and rill wash are also upland areas.

All of these descriptions can be applied to the SCA Permit Area. The geology of the SCA Permit Area consists primarily of alluvial fan and pediment deposits, at the base of the Book Cliffs, in the lower Price River drainage. In the steeper southern and western portions of the SCA Permit Area the bed rock Mancos Shale

layer is very near the ground surface. Just a few feet of sheet and rill wash cover this layer. Further to the south and west is an area classified as additional alluvial fan deposits.

Icelander Creek tributaries flow through the areas to the south and to the northwest of the SCA Permit Area, however, it is a small creek and has carved only a shallow channel in the alluvial fan deposits. All the surface discharge from the SCA Permit Area flows into the Icelander drainage.

In 1985, the Division found that Grassy Trail Creek, from approximately five miles east of East Carbon City to the confluence of Grassy Trail Creek with Slaughter Canyon, was the only Alluvial Valley Floor (AVF) within the Permitted Area of Kaiser Coal Corporation. At the recommendation of DOGM, SCA has included a copy of Plate III-29 from the Kaiser 1985 permit for the purpose of delineating the designated AVF (see Figure 1 of Appendix 7-9).

The area now identified as the SCA Permit Area was then included in the Kaiser Coal Permit Area. However, the area identified as an AVF is not part of the SCA Permit Area. The AVF is located to the northeast and at a higher elevation from the SCA Permit Area.

The Division further found that the proposed operation of Kaiser Coal "will include neither the extraction of coal nor will significant physical disturbance of the surface or groundwater regime associated with the AVF occur and that mining activities actually enhance farming activities on the AVF."

The Division thus waived the requirements of UMC785.19(d) and (e) and UMC822 which deal with additional technical information, findings, and performance standards required of operations affecting designated AVFs. (See Appendix 7-9).

The proposed operations of SCA, which include excavating the coal refuse pile deposited by the operators of the Sunnyside Coal Mine, are expected to result in a net improvement to water quality.

SCA requests that the Division wave the requirements which deal with additional technical information, findings, and performance standards required of operations affecting designated AVFs.

725 BASELINE CUMULATIVE IMPACT AREA INFORMATION

725.100 thru 725.300 Hydrologic and Geologic Information

Hydrologic and geologic information from federal and state agencies has been used to generate this Permit Application. Other information was gathered from studies and surveys conducted by SCA, or its predecessors in this project. A great deal of information regarding potential impacts on the hydrologic balance of the area by the proposed excavation and reclamation activities was obtained from studies and surveys conducted by SCC or their predecessors at the Sunnyside mines. The information presented in this Permit is provided as a resource for DOGM use to assess the probable cumulative hydrologic impacts of the proposed excavation and reclamation operations on surface and groundwater systems in the cumulative impact area as required by R645-301-729.

726 MODELING

No modeling or statistical parameter interpolation techniques were used to determine any of the information presented to fulfill the regulations of this chapter. Only data from actual observations, and laboratory testing is presented as baseline information here.

727 ALTERNATIVE WATER SOURCE INFORMATION

The proposed refuse excavating operations will not have an effect on thecurrent water quantity and quality downstream of the permit area. Becauseof this, no alternate water sources have been determined.

728 PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION

728.100 thru 728.300 Determination of PHC

A description of probable hydrologic consequences related to the hydrologic regime and the quantity and quality of water under seasonal conditions is presented within this section. The PHC determination is established from baseline information presented in this chapter, and in Chapter Six (Geology).

728.310 Impacts to the Hydrologic Balance

The hydrologic conditions in terms of water quality could be affected by two types of activities: application of water for fugitive dust control and evaporation from sediment ponds within the Sunnyside Cogeneration Permit Area. The fugitive dust control will consume certain amount of water through spraying water on the unpaved roads in use. The sediment ponds and/or slurry cells will increase water evaporation losses.

There are approximately 1.2 miles of roads to be sprayed to control fugitive dust (including upper and lower Haul Road and the Coal Access Road) within the permit area. From April through October, three trips for spraying are needed per day on average. From November through March, two trips per month are needed. This gives a total of 649 trips per year. To assume that the average road width is 30 feet and an 1/8-inch water depth per trip is needed, a total of ((649x1.2x5280x30x0.125)/(12x43560)) = 29.5 acre-feet of water is needed for fugitive dust control per year. This amount of water will be totally evaporated. Adequate underground water rights from the East Carbon / Dragerton well are available to SCA to meet the needs of dust control. Figure 7-1 includes documentation concerning SCA's water right to the East Carbon / Dragerton Well.

There are eight sediment ponds and/or slurry cells within the permit area (as shown in Plate 7-1). Except for the East Slurry Cell, each pond has an outlet structure. The outflow from each pond will eventually be discharged to Icelander Creek. There are no outlet structures for the East Slurry Cell. The East Slurry Cell receives water from the slurry ditch. . Water in the East Slurry Cell will eventually evaporate to the atmosphere or infiltrate through the slurry deposited within the cell. The infiltrated water may eventually drain to the Icelander Creek.

Conservatively estimated, there is a total water surface area of less than 8 acres for the ponds. For the purposes of this calculation, it is assumed that there is one storm which is equivalent or greater than 10-year 24-hour storm each year, and that the dewatering time for each pond is five days (0.167 month). Also it is assumed that the storms will occur from April to September when evaporation is higher. From the Utah Weather Guide (Brough, et al, 1983), Price Station (#7026), there is an average monthly pan evaporation rate of eight inches. Assume a pan evaporation correction factor of 0.7, there is total annual evaporation loss of (8x8x0.7x0.167/12) = 0.6 acre-feet.

The total water surface area for the East Slurry Cell is approximately 17 acres. If a full cell needs 15 days (0.5 month) to infiltrate to empty, conservatively estimated, the evaporation loss will be (17x8x0.7x0.5/12) = 4 acre-feet.

The total water loss from fugitive dust control and pond evaporation is 34.1 acre-feet per year. Thus, the proposed operations will slightly affect the existing stream hydrological conditions in terms of water volume.

COARSE REFUSE SEEP

The Coarse Refuse Seep has been effectively dry since the mid 1990's. The water that historically emerged from the base of the coarse refuse pile was alledged to have had two possible sources. One source could have been that water trapped in the alluvium under Grassy Trail Creek could be flowing over the Mancos Shale contact and through faults, cracks, joints or other pipes to emerge at the toe of the refuse pile. The other source could have been water from the East Slurry Cell infiltrating through fill material to the toe of the coarse refuse pile. Slurry water has not been delivered to the SCA permit site since January 1994. Continued drying of the cells and decreasing flows in the seep leads to the projection that even if water previously flowed through the refuse material, that potential contribution in the future is minimal and possibly even non-existent. The refuse pile characterization program, conducted by SCA in August 1995, did not find evidence of water flowing through the refuse pile (see Appendices 6-5 and 6-7). Historic water quality data for this seep is presented in Appendix 7-6. Further water monitoring was conducted in 1994 and 1995 and is presented in Appendix 7-4. The parameters and frequency of testing were coordinated with the Department of Water Quality. Additional information concerning this seep can be found in Chapter Nine.

Three v-notch weirs have been installed in the coarse refuse seep drainage as shown on Plate 7-1. The weirs were installed in locations that are already disturbed. These areas will be reclaimed by removing the weirs and reseeding in accordance with the reclamation plan. The weirs were installed by excavating a small trench (either with a small rubber-tire back hoe or digging by hand) and back filling around the weir. Sediment was controlled during construction by installing rows of straw bales as shown on Plate 7-1. These straw bales will be left in place to deteriorate over time. They will not need to be replaced. Rip rap was placed below the notch on the downstream side of the weirs to control erosion throughout the useful life of the weirs. The weirs will be kept clear of sediment buildup and otherwise maintained by SCA authorized personal to provide accurate flow readings. Additional straw bales may be placed in the flow prior to maintenance work. These will also be left in place to deteriorate over time and will not need to be replaced.

In the early 1990's, monitoring of the seep at the toe of the Coarse Refuse Pile indicated levels of TDS which are higher than 4,000 mg/l. These levels of TDS are believed to be naturally occurring since the TDS level is not significantly decreased by the substantial dilution of additional springs thousands of feet downstream at the permit boundary.

This seep or spring is believed to have existed before the Sunnyside Coal Mine operations begin disposing of the waste coal material in this canyon area several decades ago. If there has been a negative impact from the

refuse to the water quality of this spring, it would have been caused by the placement of material in the canyon. The operation of Sunnyside Cogeneration Associates to remove coal refuse from the canyon is expected to have a net positive improvement to the water quality.

Analysis of water monitoring conducted between 1993 and 1995 is included in Appendix 7-4. Water monitoring will be done based on the above probable hydrologic impacts analyses in terms of both water quantity and quality. Additional monitoring was performed through 2002 in accordance with amonitoring program described in Appendix 7-8. See Appendix 7-10 for a summary of the data obtained in this monitoring period. If conditions warrant any modification to the described monitoring program, SCA will submit the proposed amendment to DOGM prior to implementing any modifications.

There are a few disturbed areas within the permit area that do not report to a sediment pond. Alternate Sediment controls provide water treatment asdescribed in Appendix 7-7.

728.320 Acid or Toxic Forming Materials

A discussion of the material properties of the refuse found in the SCA Permit Area related to acid or toxic forming substances is found in section R645-301-624.220. The discussion refers to studies and analyses performed specifically to determine the effectiveness of the refuse as a power plant fuel.

A Special Coarse Refuse Use Study Report prepared by John S. Huefner in February 1981 (Appendix 7-5) took samples of the coarse refuse and raw coal to verify the refuse to be non-toxic and non-acidic. The chemical testing was done by American Chemical and Research Lab in Provo and by Ford Chemical Lab in Salt Lake City. Only one sample of refuse tested by Ford Chemical showed the manganese to be three times above the allowable limit, however, this does not show-up in other samples. This report, however, omits analysis of the Acid-Base Potential of Selenium and Boron.

Additional studies of the material properties of the refuse piles will be ongoing through the duration of the project. See Appendix 6-5 for a proposed sampling plan. If acid or toxic forming substances are encountered in future testing, a report of the concentration and volume of the material will be prepared for DOGM. This report will include a plan, for appropriate disposal of the material, which would protect the water resources in the area.

728.330 thru 340 Impacts From Mining and Reclamation

Existing or projected impacts to the hydrologic regime from mining and reclamation activities are discussed within section 728.100 and in more detail throughout other sections. Information related to runoff conveyance and sediment control is included in sections 732 and 733. Information related to general hydrology, water quality monitoring, and channel reclamation can be found in Sections 722, 724, and 760 respectively.

729 CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

729.100 thru 200 Cumulative Hydrologic Assessment by DOGM

As stated in R645-729.100 and 729.200, DOGM will provide a Cumulative Hydrologic Impact Assessment.

730 OPERATION PLAN

731 GENERAL REQUIREMENTS

General requirements given under this section are discussed specifically in the following sections: 731.100 Hydrologic-Balance Protection, 731.200 Water Monitoring, 731.300 Acid and Toxic Forming Materials, 731.400 Transfer of Wells, 731.600 Stream Buffer Zones.

731.100 thru 731.122 Hydrologic Balance Protection

Section 728.310 has discussed how the operations proposed will not affect the existing pre-operational hydrologic balance. For groundwater, this assessment is based on the lack of encountering much groundwater in drilling records for the SCA Permit Area.

The excavation of the refuse pile will not affect any of the sedimentation ponds within the SCA Permit Area. The excavated areas will likely yield somewhat higher amounts of sediment but this will easily be treated in the sedimentation ponds. Sediment Control is discussed in detail in section 732.

731.200 Water Monitoring

A water monitoring schedule was developed based on the PHC determination. This monitoring will be performed to characterize all the water within and adjacent to the permit area. This included all the UPDES discharge sites, all surface water streams, all ground water sources, and the seep at the toe of the refuse pile.

The Operational water monitoring is based on Technical Directive 004 dated May 23, 1995. The Surface and Groundwater Monitoring Locations shown on Plate 7-2 and listed in Appendix 7-8 on Table 7-2A will be monitored according to the Operational Parameters listed in Table 7-2C throughout mining until two years after surface reclamation activities have ceased. The sites will then be monitored according to the Post Mining Requirements proposed by SCA in Table 7-2D until termination of bonding.

Appendix 7-8 also summarizes the monitoring requirements from the UPDES permit which apply to the sediment ponds within the permit area. Plate 7-1 shows the locations of the UPDES water monitoring sites.

Weirs may be placed as needed to measure flows on the permit site. These may be installed as either temporary or permanent structures. (See Plate 7-19)

731.210 thru 731.215 Groundwater Monitoring

Groundwater monitoring will be performed based on the existing East Carbon/Dragerton well. The parameters and monitoring schedule will be performed based on the requirements listed in Table 3 and Table 4 included in the Guidelines. Two years of baseline data collection was performed.

731.220 Surface Water Monitoring

Each of the UPDES discharge locations as well as the seep at the toe of the refuse pile and the seep at the property boundary will be sampled in accordance with Guidelines and the UPDES Permit.

731.221 thru 731.222 Surface Water Monitoring Plan

The surface water monitoring plan is based on the PHC determination of section 728. The only determined hydrologic consequence is possible increased sedimentation in the excavated areas. This will generally be controlled by the sedimentation ponds. The monitoring plan includes sampling and testing of the sedimentation pond water as they discharge. The ponds may have intermittent discharges. As discussed in section 732, this is because they were designed for a capacity equal to a 10 year 24 hour storm event runoff. These ponds will be monitored as required in the UPDES permit No. UT0024759 found in Appendix 7-1 and as described in Appendix 7-8.

Monitoring for Acute Toxicity

Pursuant to the UPDES permit requirements, beginning July 1, 1992 the permittee conducted quarterly acute static replacement toxicity tests on composite samples from station 004. This continued until discharges ceased following cessation of the SCC wash plant.

Impacts on Icelander Creek

Impacts on Icelander Creek will be in accordance with the approved plan in Appendix 7-8.

731.223 Surface Monitoring Data Submittal Requirements

The surface monitoring data will be submitted to DOGM every three months for each monitoring location. Monitoring submittal will include analytical results from each sample taken during the approved reporting period. Sunnyside Cogeneration takes responsibility for complying with all regulations set forth by DOGM and meeting the UPDES discharge authorization limitations shown in the UPDES Permit (Appendix 7-1).

The monitoring data will be supplied to the Utah Division of Water Quality monthly as required by the UPDES permit. Results of the water quality monitoring will also be filed on the project site.

731.224 thru 731.224.2 Surface Water Monitoring Requirements

Surface water monitoring will continue, as described in Appendix 7-8, through the end of the operations of SCA, and through the reclamation process until the bond release. The monitoring points identified in Appendix 7-8 were analyzed as indicated in Appendix 7-8, Table 7-2B for a period of two years. Now the points are monitored as operational sites according to the list of parameters listed in Table 7-2C. The monitoring plan will always be arranged to meet the requirements of the Division of Water Quality via the UPDES permits.

The monitoring will be conducted to attempt to minimize disturbance to the hydrologic balance, and to achieve the goals of the approved monitoring plan.

731.225 Surface Water Monitoring Equipment and Structures

Equipment, structures and other devices utilized in conjunction with the surface water monitoring program will be properly installed, maintained and operated. The equipment and structures will be removed when no longer needed.

731.300 thru 731.320 Acid and Toxic Forming Materials

Acid and toxic forming potentials are appropriately discussed in section R645624.220 and 628.320.

731.400 Transfer of Wells

Exploration wells or monitoring wells will only be transferred after approval by DOGM and in accordance with the Utah State water laws and regulations. Approval of well transfer will also be required from the State Engineer. There are no wells currently on the SCA Permit Area. There has been significant drilling exploration of the SCA Permit Area. These drill holes will be sealed in a manner appropriate for the environment and for the proposed excavation activities. Figure 7-1 includes documentation concerning SCA's water right to the Dragerton Well.

A monitor well was installed at the toe of the refuse pile in accordance with a Permit from the State Engineer in accordance with the exploratory drilling program detailed in Appendix 6-5. All monitoring inspections, to date, at the well have found it dry.

731.500 thru 731.522 Discharges into and out of Underground Mines

The proposed operations of this Permit Application consist only of excavation of coal mine waste and refuse piles. Therefore this section does not apply.

731.600 thru 731.620 Stream Buffer Zones

All disturbance caused by the proposed operations will be well over 100 feet from any natural stream. Therefore this requirement does not apply.

731.700 Cross Section and Maps

731.710 Water Supply Intakes and Waters Receiving Discharge

All discharges from the SCA Permit Area flow into tributaries of Icelander Creek. This is shown in Plates 7-3 and 7-6. Icelander Creek is not currently used as a culinaryor irrigation supply.

731.720 Map Showing Diversions, Conveyance and Treatment Facilities

This requirement does not apply because Icelander Creek is not currently being used for culinary, irrigation, or industrial uses.

731.730 Locations of Monitoring Stations

The locations of the monitoring stations used to gather baseline information on water quality and quantity are shown in Plate 7-2. The locations of UPDES discharge monitoring sites are shown separately on Plate 7-1. These locations are identified in the field with metal posts and labels.

731.740 Map Showing the Locations of Sediment Ponds

The locations of the sedimentation ponds are discussed in section 733 and are shown in Plate 7-1. Plate 5-6 also shows the location of the refuse pile.

731.750 Cross Sections for Each Sediment Pond and Other Impoundments

See Section 732.

731.800 Water Rights

The majority of the rights in the area are held by the municipalities, SCA, and a few land owners. The rights mostly relate to Grassy Trail Creek and discharges from the Grassy Trail Reservoir created by the construction of a dam approximately 5-6 miles up Whitmore Canyon. The operations taking place on the SCA Permit Area do not affect any currently held water right.

732 SEDIMENT CONTROL MEASURES

732.100 Siltation Structures

The existing siltation structures which are a part of the refuse disposal, and proposed refuse excavation activities will be maintained to comply with the requirements of this regulation. Siltation structures that impound water are considered herein as treatment facilities and sedimentation ponds. A discussion of these facilities is set forth in Section 732. Alternate Sediment Controls may be placed as needed to improve erosion control.

732.200 Sedimentation Ponds

732.210 Compliance Requirements

There are eight impounding structures in the SCA Permit Area which are all shown on Plate 7-1. Out of the eight impounding structures, seven are sedimentation ponds serving the disturbed portions of the SCA Permit Area. Each sedimentation pond is governed by an UPDES permit which controls water qualitydischarges. Operational requirements of the seven sedimentation ponds located in the SCA Permit Area as outlined by this regulation will be met. Detail designs related to the facilities are given in Appendix 7-3.

Below is an outline of various design parameters for the sediment ponds found within the SCA Permit Area.

Pond Description	Reference Plate	Maximum Depth (ft)	Volume (acre-ft)
Coarse Refuse Toe	7-7	9.5	1.6
Rail Cut	7-8	8	4.8
Pasture	7-9	7.5	1.0
Old Coarse Refuse Road	7-10	6.0	0.9
Clear Water Pond	7-4	8	4.9
Borrow Area Pond	7-11	9.5	8.3
Coal Pile Sediment Pond	7-18	7	1.5

Topsoil stockpile sediment will be controlled by construction of an alternate sediment control around the perimeter of each stockpile. Detailed calculations for each are found in Appendix 7-7.

732.220 MSHA Requirements

The sedimentation ponds within the SCA Permit Area comply with the MSHA requirements given under R645-301-513.100 and 513.200.

732.300 Diversions

An extensive network of runoff collector ditches has been constructed within the permit area. A layout of these facilities is shown on Plate 7-1. Individual diversion dimensions can be found in Appendix 7-3. The ditches will be maintained to comply with the requirements of this regulation.

There are a few disturbed areas within the permit area that do not report to a sediment pond. Alternate Sediment controls provide water treatment as described in Appendix 7-7.

732.400 Road Drainage

All roads will be constructed, maintained and reconstructed to comply with section 742.400

732.410 Alteration and Relocation of Natural Drainageways

No alterations to existing natural drainageways areplanned for the operations in the SCA Permit Area.

732.420 Inlet Protection

Measures to be taken to protect the inlet end of ditch relief culverts (when required) within the SCA Permit Area may include revegetation, installation of riprap, or a drop box inlet. Flows applicable to runoff control ditches are generally small and inlet protection is not required to protect against erosion. If it is found that significant erosion does occur at the inlet to a ditch culvert, the items listed above will be implemented as appropriate. Details for inlet and outlet protection are given in Chapter Five.

733 IMPOUNDMENTS

There are no additional impoundments proposed for the SCA Permit Area. If the need for an additional impoundment is observed, it will be designed and certified according to the requirements of these regulations, and the other regulations within the State of Utah Coal Mining Rules. The plans and certification will then be submitted to DOGM for approval.

734 DISCHARGE STRUCTURES

See Section 744.

735 DISPOSAL OF EXCESS SPOIL

See Chapter Nine, Sections 9.6 through 9.7 and Appendices 9-2 and 9-5..

736 DISPOSAL OF COAL MINE WASTE

See Chapter Nine, Sections 9.6 through 9.7 and Appendices 9-2 and 9-5..

737 NONCOAL MINE WASTE

Non-coal mine waste will be disposed of as discussed further in Chapter Nine, Section 9.6.

738 CASING AND SEALING OF WELLS

For reasons previously discussed, there are no additional groundwater monitoring wells which need casing and sealing during the operations or reclamation activities.

740 DESIGN CRITERIA AND PLANS

741 GENERAL REQUIREMENTS

Site specific plans used for the design and control of surface drainage are discussed in the following sections.

742 SEDIMENT CONTROL MEASURES

See Section 732 for detailed designs of all sediment control structures. The major runoff and sediment control measures in the SCA Permit Area include numerous diversion ditches and several impoundments. Some Alternate Sediment Controls are in-place and maintained to reduce the contribution of sediment to receiving streams, from areas which do not report to an approved impoundment. If additional siltation structures are required, SCA will request approval from the Division prior to installation.

742.220 Sedimentation Ponds

Inspection

All sedimentation ponds will be inspected a minimum of four (4) times per year for structural weakness, erosion, proper function, sediment levels and other hazardous conditions. A written record of findings will be maintained at the SCA cogeneration facility for inspection. Reports of adverse embankment conditions including erosion, structural weakness or other hazardous conditions will be submitted to DOGM within thirty (30) days of the inspection. Hazardous conditions will be reported directly to DOGM immediately after the finding. See the inspection schedule prepared in compliance with R645301-514.

Sediment Disposal

Sediments removed from the ponds will be disposed in the Excess Spoil Disposal Areas, placed on the refuse pile used as a borrow material, or processed with material burned in the cogeneration plant. If the material is to be used as a borrow material, the material will be tested. SCA will contact DOGM to receive approval of the location and the amount of material to be used.

MSHA REQUIREMENTS

The East Slurry Cell is used as refuse storage and as a surface runoff impoundment. The East Slurry Cell meets or exceeds the size criteria of 30 CFR 77-216(a) of the Mine Safety and Health Administration and has an MSHA ID number. The impoundments will comply with the requirements of this regulation. The MSHA Approved Program for Impoundment Inspections is in Appendix 5-8.

742.230 thru 742.240 Other Treatment Facilities

Sediment from most of the disturbed area within the Permit is controlled by the collector ditches and sedimentation ponds.

Alternate Sediment Controls (ASC), installed at certain locations throughout the permit area are used to reduce the contribution of sediment to the receiving streams. These have been installed and are maintained in accordance with the performance standards outlined in Chapter 5. Plate 7-20 shows details of various ASC's which are being used at locations shown on Plates 7-1 (A-E). It is intended that as site conditions dictate, SCA may switch between different types of ASC's shown on Plate 7-20 to achieve an efficient and cost effective treatment.

Topsoil stockpiles have been revegetated to decrease the erosion potential. Berms were constructed around the perimeter of each topsoil pile to contain sediments during storm runoff events. The calculations used to design the minimum height of a berm are found in Appendix 7-7. These small berms are considered to be alternate sediment control measures, not impoundments.

The following Alternate Sediment Controls are in-place either primary or secondary sediment control:

Alternate Sediment Control	Location
Several segments installed 2000	BTCA Area #3 - Across a minor accessway leading to the weir in the northwest area of the Permit Site. Approximately 60 feet southeast of 36-inch CMP under railroad tracks.
30 L.F. installed prior to SCA	Below the outlet of the Coarse Refuse Toe Pond.
Several segments installed 2000	Across a road east of the Coarse Refuse Toe Pond
40 L.F. installed 1993	Outer southwest bank of the Coarse Refuse Toe Pond.
2100 L.F. installed 1994	BTCA Area #2 – Intermittent segments in the drainages along the toe of the area reclaimed in connection with the final reclamation of the Old Coarse Refuse Road. Silt fences below areas treated with erosion matting will not be maintained. These will be removed when field conditions indicate that they are no longer of significant value.
6 L.F. installed 1995	At the permit boundary crossing the outlet ditch from the Pasture Pond and Coal Pile Sediment Pond
10 L.F. installed 1995	In front of the inlet to the above ground culvert OCRR-C1 which flows to the Old Coarse Refuse Road Sediment Pond
450 L.F. installed 1996	Along the permit boundary north and northwest of the crushing facility to assist in reducing the potential for wind transport of fines.

Alternate Sediment Control	Location
30 L.F. installed in 1989	BTCA Area #1 Along the Permit boundary northwest of the Clear Water Pond.
15 L.F. installed in 1994	Seep Flow. Along the Permit boundary, Below the railroad culvert. These are left to deteriorate - not to be removed or replaced.
20+/- L.F. installed in 1995	Seep Flow. behind the existing weirs. These are left to deteriorate - not to be removed or replaced.
Surface Roughening - 1994 Five acres +/-	BTCA Area #2 In connection with the final reclamation of the Old Coarse Refuse Road, the surface was roughened by digging small holes or indentions. This is expected to help control sediment by reducing surface runoff while the vegetation is established.
12,000 S.Y. Straw Matting installed in 1994.	BTCA Area #2 In connection with the final reclamation of the Old Coarse Refuse Road, slopes steeper than 2:1 were treated with straw matting. As the matting degrades, vegetation is expected to increase.

742.300 Diversions

742.310 thru 742.311 General Requirements

All diversions located within the SCA Permit Area, which are shown in Plate 7-1, have been designed to minimize adverse impacts to the hydrologic balance of the permit and adjacent areas, to prevent material damage outside the SCA Permit Area and to assure the safety of the public. No diversions have been designed or are planned to divert water into underground mines. Any underground mining is significantly upstream from the SCA Permit Area.

742.312 thru 742.333 Diversion Design

See Section 732.

742.400 thru 742.423.5 Road Drainage

The roads in the SCA Permit Area are used primarily for refuse hauling and area maintenance. The road drainage control system utilized at the SCA Permit Area was discussed earlier in section 732. The collector ditches for this purpose are shown on Plate 7-1. The drainage system has been designed to safely convey

surface runoff away from road surfaces through a network of collector ditches and culverts. The system has been designed to collect all runoff waters thereby protecting downstream water quality and reducing potential for flooding. The fact that the road system does not cross local stream channels helps protect downstream water quality.

Ditches have been designed according to methodology discussed previously. The design is to safely pass a 10-year, 6-hour storm as required for miscellaneous flows. Culvert sizes have been selected to ensure design capacity and structural integrity. The capacity of the road drainage system will be maintained. If the system is ever damaged reducing capacity of a ditch or culvert, repairs will be implemented immediately.

743 IMPOUNDMENTS

See Section 732.

744 DISCHARGE STRUCTURES

Discharge from sedimentation ponds and impoundments is controlled by riprap channels and other devices where necessary to reduce erosion to prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance. Detailed designs of the spillways from each pond are provided in Appendix 7-3. Cross-sections are provided on the plate corresponding to each pond.

745 DISPOSAL OF EXCESS SPOIL

See Section 735.

746 COAL MINE WASTE

746.110 thru 746-430 Waste Disposal Plans

Coal Mine Waste disposal within the SCA Permit Area can occur in the following:

Excess Spoil Disposal Area #1 (see Appendix 9-5)
Excess Spoil Disposal Area #2 (see Appendix 9-7)
Coarse Refuse Pile (see discussion below and in Chapters 5 and 9)

Coarse Refuse Pile

The outer slope of the refuse pile is maintained at a 27° slope. At 50 feet vertical increments, a 20-foot wide terrace is constructed for water runoff and erosion control. Construction of the refuse pile was started before the 1977 enactment of the current regulations. As a result, the sub-drainage system required by current regulations was not incorporated in the design; however, a 24-inch perforated culvert was reportedly placed in the drainage bottom to collect groundwater seepage.

All surface water drainage from the area above the waste bank and from the crest and face of the final structure will be diverted away from the fill into stabilized diversion channels designed to pass safely the runoff from a 100-year, 6-hour precipitation event. A plan view of the diversion ditches is found in Plate 71.

747 DISPOSAL OF NON-COAL MINE WASTE

See Chapter Nine, Sections 9.6 and 9.7.

748 WELL CASING AND SEALING

Groundwater monitoring wells that may be utilized within the SCA Permit Area will be drilled and installed by a driller licensed in the State of Utah. Procedures and materials used to drill and install the groundwater monitoring wells will be in accordance with the State of Utah Administrative Rules and Water WellDrillers (July 15, 1987) Appendix I, Monitor Well Installation Guidelines. Abandonment and sealing of groundwater monitoring wells will also be in accordance with Rule 12 of the Utah rules. Currently there are no groundwater supply wells in the SCA Permit Area. There are some piezometer tubes near some of the impoundments.

Exploration boreholes that are drilled on or within the refuse pile for the purposes of determining the thickness of the coal mine waste, or the suitability of the coal mine waste for use in the cogeneration plant, will not be sealed through the interval within the refuse pile. However, intervals of native soil or bedrock that are penetrated by exploration boreholes will be sealed with bentonite or other suitable grout in accordance with Utah Administrative Rules for Water Well Drillers (July 15, 1987), Rule 12.

750 PERFORMANCE STANDARDS

751 WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS

Discharges of water from the disturbed areas, via the collector ditches and sedimentation ponds will continue to be made to comply with all Utah and federal quality laws and regulation. Effluent will be according to 40 CFR Part 434.

752 SEDIMENTATION CONTROL MEASURES

Sedimentation control measures will be maintained, reclaimed and constructed if needed and approved, according to R645-301-732, 742, and 763. Additional details can be found in each respective section referenced.

Existing, and new roads (if needed) will be located, designed, constructed, reconstructed, used, maintained, and reclaimed according to R645-301-732.400, R645-301-742.400, and R645-301-762 to achieve the following objectives:

1. The control or prevention of erosion, siltation and air pollution. This is obtained through the revegetating or stabilizing of all exposed surfaces subject to increased erosion

2 The control or prevention of additional contributions of suspended solids to stream flow or runoff outside the permit area.

3. Prevent the violation of effluent standards given under section 751.

4. Minimize the diminution to or degradation of the quality or quantity of surface and ground water systems.

5. Refrain from significantly altering the normal flow or water in streambeds, or drainage channels.

A proposed road which meets all of the previously mentioned requirements is discussed in Chapter Five.

753 IMPOUNDMENTS AND DISCHARGE STRUCTURES

Sections 732 through 734 discuss the locations of discharge structures and impoundments, and how they will be maintained, and reclaimed.

754 EXCESS SPOIL, COAL MINE WASTE, AND NON-COAL MINE WASTE

See Chapter Nine and Chapter Ten.

755 CASING AND SEALING OF WELLS

As has been previously discussed there are no additional wells to case and secure in the SCA Permit Area.

760 RECLAMATION

761 GENERAL REQUIREMENTS

See Chapter Nine, Mine Plan for details on contemporaneous reclamation. See Chapter Ten, Reclamation Plan for details on final reclamation.

765 PERMANENT CASING AND SEALING OF WELLS

Any type of existing drill hole will be appropriately cased and sealed, or back filled during the reclamation process.

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CHAPTER EIGHT
800 BONDING AND INSURANCE

820 REQUIREMENT TO FILE BOND

SCA currently has on file with the Division of Oil, Gas and Mining (DOGM), a bond or bonds for performance made payable to DOGM and conditioned upon the faithful performance of all the requirements of the State Program, the permit and the reclamation plan.

Once reclamation operations have begun, all areas will be protected from further surface disturbance prior to the acceptance by the DOGM. Chapter 9 and Chapter 10 outline full details of the reclamation activities and describe how each area within the SCA Permit Area will be reclaimed. The Interim Reclamation Plan is included in Chapter 9 and the Final Reclamation Plan is included in Chapter 10. Activities mentioned in the reclamation plans have been estimated and included in the total bond amount.

830 DETERMINATION OF BOND AMOUNT

SCA proposes that the amount of the bond be determined as set forth in Table 8-1 Determination of Bond Amount. The total costs shown in Table 8-1 are based on quantities of work as identified on the Permit Term Reclamation drawings (see Plates 8-1 through 8-5). Rates were determined using the 2001 Blue Book Rental Rate Guide, the Caterpillar Performance handbook, and the 2001 Means Estimating Guides (see Table 8-2).

The Permit Term Reclamation Plan and supporting cost calculations are to be used by the Division to determine the required performance bond amount as outlined in R645-301-830. Determination of the bond amount has given consideration to such factors as topography, geology, hydrology and revegetation potential. Actual reclamation of the SCA permit area can be based on this reclamation plan in the event of forfeiture of the bond (R645-301-880.900).

PROPOSED PERMIT TERM RECLAMATION SCENARIO

The Permit Term Reclamation Plan is based on a scenario during the –2003-2008 Permit Term representing partial removal of the refuse which existed prior to the beginning of mining operations under the direction of SCA. The intended Final Reclamation Plan reflected in Chapter Ten is based on the scenario which would occur following removal of the combustible refuse in the pile. The estimated bond calculations do not anticipate placing four feet of cover over the entire disturbed area (see Plate 8-4 for cover depths corresponding to different portions of the permitted area). Regrading costs estimated to facilitate drainage from the refuse area and remove potential highwalls from the active mining area (East Slurry Cell and Coarse Refuse Pile) included in Table 8-1 are based on the proposed Rough Grading Plan shown on Plate 8-2. Evidence was not found in the program to characterize the refuse pile which indicated significant quantities of precipitate materials as previously suspected by Division personnel. Contaminated underlying soil materials were also not found (see Appendix 6-7).

Large quantities of material are not anticipated to require disposal at certain intermediate stages of operation nor following extraction of combustible fuel materials. Rather, the excess spoil disposal areas are expected to be constructed by disposing of the specified materials incrementally throughout the life of mining operations.

The General Reclamation Procedures described in the text of Chapter Nine are applicable to the reclamation necessary in the permit term reclamation plan. The total number of acres that will require reclamation is shown on Plate 8-4. Reclamation activities are anticipated to be able to be completed during one construction season. Distribution of borrow material is the main task with most all other tasks being scheduled to occur during the same time. Providing an adequate start in the Spring, it is expected that the work can be completed to allow for seeding in the Fall.

RECLAMATION PHASING

Plate 8-1, identify the areas to be reclaimed during Phase One or Phase Two Reclamation. The majority of the permit area will be reclaimed during Phase One. In general, Phase Two areas are composed of: areas around sediment ponds; roads needed for access until Phase Two Reclamation, but not needed for access to easements through the Permit Area; and the topsoil piles previously set aside for covering these Phase Two areas.

ROADS AND PERMANENT STRUCTURES

Some existing roads within the SCA permit area will be required to provide occasional access to other non-mining related entities in accordance with existing easements through the SCA property. The easements which require road access are those associated with maintenance of power lines which cross through the property (power lines are identified on Plates 5-1 and easements are identified on Plate 1-1). An easement or right of way also exists for the railroad towards the west and north sides of the permit area and access to these areas may also be needed at some future time. The anticipated level of activity for these roads would be minimal.

Portions of Roads A, B, E, J, K, Q, & R (as identified on Plates 5-2) are anticipated to be necessary for future access. The portions of these roads which will not be reclaimed are represented on Plates 8-1, 8-4, and 8-5 by leaving these roadway sections uncolored, unshaded, or unhatched. All other roadways are planned for reclamation and are shown as such on the above named plates. Roads that are not reclaimed will be maintained in accordance with the requirements for permanent transportation facilities. Chapter Five and associated drawings discuss the design, operation and maintenance for all roadways. The approved post-mining land use as described in Chapter Four should not be adversely affected by retention of the roadway sections mentioned above.

No other structures associated with the mining operation are anticipated to remain as permanent structures. If other structures that are not currently anticipated in this plan, become necessary to meet the postmining land use, SCA will submit a permit amendment to DOGM to request the change.

REGRADING

Plate 8-2 identifies roughly-graded contours which are acceptable for reaching the post-mining land use. The intent of regrading is to smooth out evidences of excavation benches and create acceptable surface drainage conditions. Modifications to the regrading plan are expected to be necessary depending on the actual conditions that exist in the event of bond forfeiture at some future time. Current impoundments such as the East Slurry Cell are shown to be filled, breached, and/or regraded to the extent that drainage off of the site would be facilitated without impounding large quantities of water. Costs estimated to breach this impoundment for drainage purposes are included in Table 8-1. General regrading of the active mining area may be necessary to smooth out high walls, benches, or other temporary mining characteristics. General regrading costs are estimated in Table 8-1.

HYDROLOGY

Appendix 8-1 provides a comprehensive hydrologic plan of the permit area requiring reclamation. Plate 8-3 identifies the drainage areas, diversions, and sediment controls to be used in the Permit Term Reclamation Plan.

RECLAMATION SOIL COVER

Plate 8-4 shows the quantity of approved borrow material that is available for use and the depth of borrow material cover or other surface treatment desired for the post-law disturbed area within the permit boundaries. Areas from which coal-type or acid/toxic material will not be removed are shown to be covered with four feet of borrow material.

The program for characterization of the refuse pile (see Appendix 6-7) found that the majority of the refuse material analyzed was not potentially acid nor toxic forming. Nonetheless, SCA has maintained the commitment to cover coal mine waste with four feet of borrow material for vegetative purposes. In the future, SCA may utilize revegetated test areas to demonstrate that less than four feet of soil cover is necessary for revegetation.

Areas which would require four feet and have already been covered with two feet for interim reclamation purposes are shown to be covered with two feet of borrow material. Documentation is included in Appendix 2-11 which demonstrates that the in-place reclamation material is adequate for use as part of the required final reclamation cover. Areas without significant quantities of coal material, but which, under present conditions, would require borrow material cover to achieve sufficient revegetation success, are shown to be covered with up to eighteen inches of borrow material. Areas that have not been significantly contaminated with coal materials will be cleaned and are shown to be scarified. If topsoil was salvaged at the time the area was first disturbed, the area is shown to be scarified and covered with topsoil.

Plate 8-5 shows the areas to be seeded with the different approved seed mixtures. The seed mixtures are identified in Figures 10-2, 10-3, and 10-4.

MAINTENANCE THROUGH BOND RELEASE

Approximately 75 percent of the disturbed portion of the SCA Permit Site was originally disturbed prior to the laws of 1977 (See Plate 5-7 Previously Mined Areas, and Plate 5-8 Existing Surface and Subsurface Facilities and Features). SCA intends to reclaim all of the disturbed land that has continued to be used for mining purposes since these laws took affect. The bond includes an amount for Monitoring and Maintenance of the redaimed area of the estimated total reclamation costs.

POTENTIAL FOR OPERATIONAL ADJUSTMENTS TO BOND ESTIMATE

Costs may be adjusted as conditions of the SCA Permit Area are altered. The SCA Permit Area will be undergoing constant changes as contemporaneous reclamation proceeds. As a result, the permittee will request a reduction of the applicable value of the bond, in accordance with R645-301-880, as reclamation takes place over portions of the permit area. DOGM has the discretion to alter the bond amount to reflect current conditions of the SCA Permit Area.

890 TERMS AND CONDITIONS FOR LIABILITY INSURANCE

Certificate

The required proof of insurance certificate is filed with Chapter 1 as Figure 1-1. It was issued by an insurance company, authorized to do business in Utah, certifying that Applicant has a public liability insurance policy in force for the coal mining and reclamation activities for which the permit is sought.

Rider

The policy includes a rider requiring that the insurer notify DOGM whenever substantive changes are made in the policy including any termination or failure to renew.

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9.1 MINING PLANS

The refuse disposal area, previously created by the Sunnyside Coal Company (SCC), has been acquired by Sunnyside Cogeneration Associates (SCA) to serve as a long-term supply of waste fuel for its coal mine waste-to-energy facility, located adjacent to the SCA Permit Area. SCA's alternative energy project has been approved by the Federal Energy Regulatory Commission as a Qualifying Facility, based on the usage of coal mine waste as fuel in its fluidized-bed combustion boiler. SCA will use "active waste" from off-site processing plants/refuse piles, "accumulated waste" from refuse piles, and other alternate fuels as sources of waste fuel for the facility. SCA's fueling plan will require excavation of coal mine waste from the existing refuse pile, which began as early as January 1993.

Based on SCA's contract for the sale of electricity to Utah Power and Light, handling coal mine waste to serve as an alternative energy fuel will be a consistent and continuous process. Coal mine waste that continues to be generated by off-site preparation plants will also be factored into SCA's fueling strategy, which can allow direct acceptance of coal mine waste at the facility, or temporary placement within the refuse disposal area prior to utilization.

SCA will excavate coal mine waste from the refuse disposal area based on sampling and analyses and a materials handling plan which will be periodically updated by SCA. Excavation of the coal mine waste will be considerate of material quality, pile and embankment stability, and mine operation. Over the life of SCA's facility, nearly all of the coal mine waste will be burned to generate electricity. Final reclamation of the refuse pile will be accomplished after all of the coal mine waste is either burned as a fuel, or repositioned within the refuse disposal area for final disposal, if determined to be unacceptable fuel material (i.e., ashes, rock, soil, etc.).

Plate 9-4 and 9-7 present an overall projection for thesequence of mining events. The majority of mining activity is expected to be concentrated within the areas identified in the mine sequencing maps. However, in order to obtain the proper blending of material which will be suitable for use in the adjacent cogeneration plant, excavation of coal mine waste may occur in any of the existing disturbed areas of the SCA Permit site. Mining activities will regularly occur in the storage areas and in the slurry handling areas throughout the life of the mine. Information used to compile these mine sequencing maps was gathered mostly from the John T. Boyd Reports found in Appendix 9-1 and 9-3. Appendix 9-1 presents the John T. Boyd fuel study . Data, including boring logs, to substantiate the conclusions of the Mine Plan are included in Appendix 93.

9.2 DESCRIPTION OF PRESENT DISTURBANCE

Presently approximately 57% of the SCA Permit Area is disturbed. The disturbances have been caused from 1) coal mine waste disposal, 2) roads, and 3) sedimentation ponds and ditches. The majority of the impacted land was disturbed prior to the present resource protection laws. The future activities of the SCA Cogeneration facilities are expected to cause little or no new disturbances to vegetated areas as the permit activities will be located mainly in areas that have been disturbed in the past.

All facilities are shown on Plate 5-1. Plate 3-1 outlines the areas of pre- and post-law disturbances.

9.3 RECLAMATION ACCOMPLISHED TO DATE

Interim reclamation was conducted in the fall of 1992 on the faces of lifts one through four of the coarse refuse pile. Approximately two feet of borrow material was placed on these areas to control fires that had been burning within the coarse refuse pile. SCC conducted this project in cooperation with DOGM. Interim seeding on lifts three and four was accomplished by SCA in the spring of 1994.

SCC accomplished interim reclamation prior to 1993 on the east embankment of the East Slurry Cell, on the north embankment of the West Slurry Cell, and on a small portion of the south embankment of the West Slurry Cell. Final reclamation is anticipated to be accomplished by SCA in accordance with the schedule and design details specified in this permit.

Final reclamation work was accomplished by SCA during 1994 on the Old Coarse Refuse Road near the south end of the permit area. This work was completed in accordance with a plan approved by DOGM. Phase 1 bond release has been granted by the Division for this work.

Interim reclamation was accomplished by SCA during 1994 on the southwest hill next to the refuse pile where three culverts were installed. Final reclamation is anticipated to be accomplished by SCA in accordance with the schedule and design details specifed in this permit.

Interim reclamation was accomplished by SCA during 1995 on the South Embankment of the East Slurry Cell. Reseeding took place during the regular seeding window of that year. Final reclamation is anticipated to be accomplished by SCA in accordance with the schedule and design details specified in this permit.

9.4 GENERAL RECLAMATION OBJECTIVES

The reclamation activities proposed in this chapter are intended to meet the following specific objectives:

Regrading of the areas within the coarse refuse pile, slurry cells and other disturbances to achieve a stable, post-mining contour which will be compatible with the surrounding area, similar to the original pre-mining contour, free-draining, and conducive to revegetation.

Restoration of the natural drainage pattern through the disturbed area to the extent practicable while maintaining appropriate sediment controls at the periphery of the disturbed areas.

Covering areas that have been cleaned of refuse or slurry with the required depth of topsoil or borrow material to allow revegetation of these surfaces.

Reseeding the regraded surfaces with a species mix designed to re-establish the surrounding native vegetation on the reclaimed areas and provide for wildlife habitat.

Monitor and maintain the reclaimed property until the reclamation success standards are achieved and the bond is released.

9.5 AREAS TO BE RECLAIMED AND PLANNED RECLAMATION

The area of reclamation and reclamation sequencing is shown in Plate 10-3.

During the mining plan phase of the project the coarse refuse pile and East Slurry Cell will be excavated and during reclamation the site will be covered with borrow material, recontoured and revegetated. The existing sediment ponds will be kept in-place until the final reclamation phase to control runoff from the area.

9.6 EXCAVATION AND DISPOSAL OF COAL MINE MATERIAL

SCA's activities will include excavation and handling of non-coal mine waste, coal mine waste, and redisposal of non-combustible materials within the SCA Permit Area. Temporary storage of non-coal mine waste (including, but is not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber, and other combustible materials generated during mining activities). will be in the area just west of the Pasture Pond, between the Pasture Pond and Industrial Borrow Area 1 (See Plate 5-1). The site is approximately 1.1 acres and will be used as a temporary storage facility for material not suitable (non-coal mine waste) for the Excess Spoil Disposal Area sites produced from within the SCA Permit Area Temporary storage of non-coal mine wastes will be conducted to ensure that leachate and surface runoff do not degrade surface or groundwater, that fires are prevented, and that the area remains stable and suitable for reclamation and revegetation compatible with the natural surroundings. It should be noted that accommodations have NOT been made for the disposal of non-coal mine waste that is produced from the Sunnyside mines. It is Sunnyside Coal Company's (SCC) responsibilityto dispose of all non-coal mine waste produced from their facility outside of the SCA Permit Boundary. SCC has NOT been authorized to store or dispose of non-coal mine waste within the SCA Permit Boundary.

Final disposal of non-coal mine waste will be in an appropriate local, State-approved solid waste landfill. All non-coal mine waste will be disposed of in a timely manner as it is accumulated. It is not foreseen that there will be a significant amount of non-coal mine waste that will require disposal. At no time shall any non-coal mine waste be deposited in a refuse pile or impounding structure.

The mine sequencing maps 9-4 and 9-7 project the excavation of coal mine waste within the SCA Permit Area. These are projections and may need to be revised with each permit renewal if existing conditions within the refuse pile are discovered to be significantly different than expected. The annual reports submitted to DOGM should be adequate to keep the Division advised concerning the mining progress.

The majority of mining excavation is expected to be concentrated within the areas identified on the mine sequencing maps. However, mining activities may occur within any of the existing disturbed areas of the SCA Permit site and should be expected to occur regularly in the storage areas and the slurry handling areas.

Mine plan delivery parametersare as outlined in Table 9-1.

TABLE 9-1
MINE PLAN DELIVERY PARAMETERS

	TONS		
Mine Plan Deliveries	Coarse	Fines	Total
Average annual fuel requirement	310,102	99,898	410,000
Average daily basis (240 days)	1,292	416	1,708
Average hourly basis (1,920 hours)	161.5	52	213.5
Number of trips per day (56.5 tons)	23	7	30
Trips per operating hour	3	1	4

The equipment typically used for loading and hauling services are one Caterpillar 980C type front-end loader with a modified 7.0 cubic yard bucket and one hauler with dual trailer rated at 60 tons capacity. Based on one 10-hour shift and a 5-day workweek, this equipment allocation is more than adequate to consistently deliver the amount of waste coal fuel required by the cogeneration facility.

9.6.1 Coarse Refuse

There are four locations that will be utilized specifically for the temporary storage of coarse and fine refuse. These areas are shown on Plate 5-1 and on Plate 9-7. Specifically section 9.6.3, includes further discussion concerning the practicality of utilizing the temporary storage areas

9.6.2 Fine Refuse

One of the prime objectives of the mine plan is to minimize material handling.
Many constraints may be encountered during the mining of coarse and fine refuse.. SCA will adjust mining activities as needed to meet the operational requirements of providing the proper mixture of fine and coarse refuse to the cogeneration plant.

The sequencing as planned exposes coarse refuse ahead of requirement and does not create excessive high wall height between one operating area and another.

9.6.3 Temporary Storage Areas

Four temporary storage areas exist within the Permit Area for blending, mixing, handling, and storage of coarse refuse and fine refuse. The reasons for these storage areas are: a place to temporarily store coarse refuse and fine refuse being brought to the SCA Permit Area, and to create a smoother, more efficient operating procedures for material prior to entering the crushing units.

These areas will be used for blending, mixing, handling and storage of the various materials to be used as fuel in the power plant.

Storage Area 1

Storage Area One measures 2.9 acres or 126,324 square feet. The storage capacity of each 4-foot lift is about 20,200 tons as follows:

$$\frac{126{,}324\ ft^2 \times 4ft \times 80lbs/\ ft^3}{2000lbs/ton} = 20{,}212\ tons$$

The surface of Storage Area One slopes towards the southwest at about 3% grade. The drainage direction is southwest. There is a ditch that runs parallel to the southern boundary of Storage Area One that drains to the existing 24" culvert at the south end of the New Access Road then to the Pasture Sediment Pond. The drainage locations are shown on Plate 9-2.

Approximately 1.95 acres of Storage Area One was undisturbed and has been reclassified as "post-law disturbed" (see Plate 3-1) due to the storage of coarse refuse material in this area.

Topsoil removal will be consistent with approved methods outlined in Section 9.8. Topsoil from Storage Area One will be placed adjacent to the northeastern boundary of the SCA Permit Boundary as shown on Plate 5-1.

Minor alterations to both the Lower and Upper Haul Roads provided access into and out of Storage Areas One and Two. Both of these roads have been designated "Primary Roads". The east end of the Lower and Upper Haul Roads was slightly altered to allow easy access into and out of Storage Areas One and Two. The west intersection of Storage Area Two and the Upper Haul Road will also be changed to allow access into Storage Area Two from the west side. The proposed changes to the two roads are minor.

Topsoil was handled according to DOGM guidelines and was consistent with the plans outlined in the approved SCA Permit Document. Vegetation was removed and topsoil was stripped and stockpiled. Topsoil piles are labeled with visible signs and measures will be taken to protect the topsoil from further disturbance. Topsoil will be used during final reclamation and therefore, will not be respread over the roadway embankment.

Trees and large shrubs were removed prior to topsoil removal. Small shrubs, grasses and forbs were collected with the topsoil material. Coal mine waste was separated from this material and a Soil Tabulation Chart was completed for the topsoil which was removed. Topsoil was stockpiled near the northeast boundary of Storage Area One as shown on Plates 5-1 and 5-5. The topsoil storage pile was contoured to minimize soil loss and seeded with the interim seed mixture. Fertilizer was not required on the stockpiles. A small berm will be constructed at the base of the new topsoil pile to prevent erosion until vegetation becomes established.

Three grab samples have been taken in Storage Area One (sample locations are shown on Plate 5-1) and testing has been completed. The samples were tested according to Table 1 of the DOGM's *Guidelines for Management of Topsoil and Overburden.* Based on DOGM's overburden evaluation for vegetative root zone, the material in Storage Area One is rated 'Good'. These results are included in Appendix 9-4.

Storage Area 2

Storage Area Two measures approximately 3.1 acres or 135,036 square feet. An active industrial waste dump occurs in this area as a depression measuring 25,000 square feet and averaging 8 feet deep. To prepare Storage Area Two, the floor of the Industrial Waste Dump will be leveled. Utah Department of Environmental Quality (UDEQ) regulations will be followed to ensure proper closure of the dump site. The following section outlines procedures that will be followed to ensure compliance.

According to R315-303-2(3) of the UDEQ's regulations, "Any landfill that received waste after October 9, 1991 but stopped receiving waste before October 9, 1993 is exempt from all requirements of this section except for final cover." The Industrial Waste Dump located on SCA's property falls under this requirement. The closure of the site entailed complying with the requirements listed below:

1) At least 18" of compacted soil with a permeability of 1×10^{-5} cm/sec or less or equivalent will be placed upon the final lifts. Artificial liners may replace compacted soil covers provided that a minimum of either 20 mils reinforced or 40 mils non-reinforced thickness is used and is covered with eighteen inches of natural subsoil present in the unit.

2) The grade of the surface slopes will not be less than 2%, nor the grade of side slopes more than 33%.

An addition to the above requirements, SCA exterminated all rats or other vermin from the site, extinguished all fires, covered all solid wastes with consolidated, compacted material at least 18 inches deep, graded to provide proper drainage (see discussion below), and will reclaim the site upon final reclamation of the entire SCA Permit Area. These requirements are outlined under R315-304-8 of the UDEQ Division of Solid and Hazardous Waste regulations.

The natural drainage of the site is toward the east at approximately 2%. Storage Area Two was graded to allow drainage toward the northeast at approximately 2% grade (see Plate 9-2). An 18-inch culvert was installed at the northeast corner of the site which allows drainage into the Pasture Sediment Pond. Hydrologic calculations are included in Appendix 7-3. In addition, a 12" high berm was constructed around the southern perimeter of Storage Area Two to prevent runoff from the West Slurry Cell from entering the storage area.

Storage Area 3

Storage Area Three (approximately 7.5 acres) will be used primarily when additional storage is required if Areas One and Two cannot handle the amount of coarse refuse and fine refuse being generated. Fine refuse removed from the active Slurry Ponds numbers One and Two is currently stored within this area. The fine refuse (approximately 15,000 tons) occupies 25,000 square feet of surface (of the total 275,000 square feet available for coarse refuse storage) in two separate areas. The coarse refuse storage capacity of each lift is approximately 44,000 tons.

The surface slopes toward the west at about 6% grade. Drainage direction is west-southwest to the ditch which transports slurry to the East Slurry Cell (when in use). Additional grading is not necessary for this area.

Storage Area 4

Storage Area Four is located inside the loop of the New Access Road. The area is approximately 1.5 acres and runoff from this area is diverted to the Pasture Sediment Pond. At times, coarse refuse from the existing coarse refuse pile is stored in the center of the New Access Road loop prior to being placed on the conveyor.

This area is also utilized for temporary storage of High Ash Fuel Reject and/or ROM coal acquired from outside sources.

Maintenance

Maintenance of the storage areas will consist of providing general maintenance and inspections of the surrounding structures, drainages, culverts, and roads.

Water or other dust control measures will be applied as necessary to reduce dust. General road maintenance procedures will be practiced and inspections will be done as necessary. Inspections will consist of: erosin control, repair of structures and drainage systems, removal of debris in culverts and replacement of road surfacing material as needed.

Reclamation Plans

Reclamation plans will not deviate from those outlined in Chapters 9 and 10. Approximately two acres of Storage Area One, which had minimal mining related disturbance in the past, were disturbed as a result of the initiation of the temporary storage areas. Reclamation activities for this area will follow procedures outlined in section 9.9.1 GENERAL REVEGETATION PROCEDURES.

9.6.4 General Refuse Handling Procedures

Currently, SCA is utilizing coarse refuse from the coarse refuse pile for use as fuel in the cogeneration facility. Prior to the material being used as fuel, whether it be run of mine ("ROM") coal or waste coal, it must be run through the receiving hopper and sized accordingly to meet operational specifications of the cogeneration facility. Nonetheless, since the crushing facilities are designed for softer coal type materials, there are instances when the material from the coarse refuse pile does not meet sizing requirements and is rejected by the crushing unit, i.e. cannot be sized correctly. This material is often rejected due to a high rock content and a low coal content.

The quality of the reject material will be determined. The final use or disposal of the reject material will be dependent on the fuel potential of the material and the potential for alternate acceptable uses.

The stockpiling of the reject material will be in accordance with applicable DOGM regulations. When placed in the temporary storage area or back on the coarse refuse pile, the high fuel potential material will be placed in 4-foot lifts, but will not be compacted. Compaction will not be accomplished for the area being mined due to the fact that the pile is continually altered due to excavation activities.

The low fuel potential material that is placed in an Excess Spoil Disposal Area will be in accordance with the approved plan and applicable regulations under R645-301-535. Slopes in both areas will be at a maximum of 2.5:1 unless otherwise approved by DOGM. Drainage of the areas will follow the existing drainage of the area and will be contained in an existing sediment pond.

The New Access Road, located adjacent to the cogeneration facility, plays a vital rolein the transporting of material from the SCA Permit Site to the Cogeneration Facility. The New Access Road, the hopper, and the crushing/screening facilities are within the boundaries of the SCA Permit Area. However, the conveyor to the Cogeneration facility's storage silos is not within the SCA Permit Area. A detailed description of the waste coal handling system can be found in Chapter Five, section 527. SCA transports coarse refuse from the coarse

refuse pile and/or Storage Areas to the cogeneration facility via the New Access Road. The coarse refuse is then placed on the conveyor system and screened before entering the storage silos. The material that is rejected during the screening process can be dumped into the Waste Coal Storage Area (see Plate 5-1). After it has been stored it is taken back to the New Access Road and is either temporarily stored in one of the storage areas, or immediately placed back on the conveyor to be screened andused in the cogeneration facility. At times, the coarse refuse from the existing coarse refuse pile is stored in one of the temporary storage areas prior to being placed on the conveyor.

The New Access Road was constructed by SCA specifically for these operations. The design of the road was approved by DOGM prior to construction and DOGM approved the road once it was built. Drainage from this road is diverted to the Pasture Sediment Pond (see Plate 7-1A). Hydrologic calculations for the Pasture Pond are included in Chapter Seven (Appendix 7-3).

There are instances when SCA will purchase and/or transport material that originates off-site (i.e. from other coal mines) to the SCA Permit Area. For example, SCA may need topurchase approximately six to seven thousand tons of ROM coal from outside sources each year. Also, coal mine waste from other refuse facilities (from active or AML sites) may be transported to the SCA facility. SCA has acquired rights to refuse material from the Star Point Mine. Transport, mixing, and utilization of this other fuel material is a regular part of the mining operation at Sunnyside. Prior to being utilized at the cogeneration facility, this material may be blended with the existing coarse refuse in order to achieve the most effective blend of material for the cogeneration facility. Blending of the material will be accomplished by placing it in one of the Storage Areas (One, Two, Three or Four) or on the existing coarse refuse pile.

In 1993, SCA acquired the right to use approximately 24 railroad cars of ROM coal (approximately 2,400 tons) that was recovered from a train wreck. SCA utilized this coal in the cogeneration facility. SCA followed the plan outlined above by first storing the material in one of the storage areas or on the coarse refuse pile. The material was then fed through the waste coal receiving hopper and utilized in the SCA facility. In the event that this material had contained spoil material, the spoil material would have been separated from the higher quality material and placed in the Excess Spoil Disposal Area. In a worst case scenario, spoil may have comprised approximately 10% or 240 tons of the total quantity.

Stockpiling of the excess spoil material in the Excess Spoil Disposal Areas will be in accordance with applicable DOGM regulations. All material will be transported and placed in a controlled manner in horizontal lifts not exceeding four feet in thickness. If necessary, the pile will be compacted to ensure mass stability. The fill material will be placed to maintain a minimum long-term static safety factor of 1.5. Periodic structural stability inspections will be accomplished to monitor the stability of the pile.

Some concerns exist about handling refuse material that has a net acid-forming potential. The program SCA conducted, for characterization of the refuse pile, identified some material which had a net acid-forming potential. Although the majority of the material analyzed was not acid- nor toxic-forming, SCA will exercise caution in the handling of all coal mine waste material until it is determined that the material is not of concern. The efforts to be taken to determine non-acid and non-toxic potentials are as described above concerning rejected low fuel content material. The precautions to be taken with potentially acid- or toxic-forming material include the following: 1) control surface runoff from the area covered with refuse by diverting through approved sediment ponds and meeting all UPDES discharge requirements for the pond; 2) minimize to the extent possible the quantity of surface flows which run onto or through refuse areas; 3) minimize the potential for spreading of refuse material to undisturbed areas by careful excavating and hauling; 4) other efforts to exercise care through efficient operational methods will also be taken.

9.6.5 Final Disposal of Waste Material (Excess Spoil and Coal Mine Waste)

The plan presented in Appendix 9-5 describes the design, construction, operation, and maintenance of the Excess Spoil Disposal Area #1. A geotechnical investigation of the foundation was conducted by SHB AGRA INC and is included as Appendix 9-2. Associated maps and cross-section drawings of the area as designed are Plates 9-1 A, B, C & D. Appendix 9-7 presents the plan for the Excess Spoil Disposal Area #2. Maps associated with this plan are included as 9-8, A-D.

Excess spoil and coal mine waste will be placed in a designated Excess Spoil Disposal Area in a controlled manner to:

(1) Minimize adverse effects of leachate and surface-water runoff from the fill on surface- and ground-water quality and quantity;
(2) Ensure mass stability and prevent mass movement during and after construction;
(3) Ensure that the final disposal facility is suitable for reclamation and revegetation compatible with the natural surroundings and the approved post-mining land use;
(4) Not create a public hazard; and
(5) Prevent combustion.

At no time will any non-coal mine waste (including, but not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber, and other combustible materials generated during mining activities) be deposited in the excess spoil fill. No burning waste will be placed in the fill.

The disposal areas are designed in accordance with the requirements for excess spoil fills as well as for refuse piles. Coal mines waste which is disposed of in the excess spoil fill will be placed in accordance with the requirements specified in Appendices 9-2, 9-5 and 9-7 and will be of the proper characteristics to be consistent with the design stability of the fill. Coal mine waste materials from activities located outside the SCA permit area may be disposed of in the permit area only if of the proper characteristics to be consistent with the design stability of the fill.

Information used to design the Excess Spoil Fill was obtained from the John T. Boyd Report presented in Appendix 9-1, the Foundation Investigation Report for Excess SpoilDisposal Area #1 by SHB AGRA Inc. presented in Appendix 9-2, information available from Sunnyside Coal Company, and field surveys conducted by SCA.

The SHB AGRA foundation investigation report, found in Appendix 9-2, is summarized below.

STABILITY

The fill should be set back 25 feet from the crestof the natural foundation slope.
The outer slopes of the fill should be no steeper than 2.5H:1V.
Measures should be taken to prevent surface water discharge on the side slopes of the fill and foundation.
Waste material from outside sources with uncertain geotechnical engineering properties, should be placed 10 feet from the outer slopes so that they will not influence potential sliding surfaces in the spoil pile.
A mass stability factor of safety greater than 1.5 will exist.

Groundwater Conditions

No signs of groundwater were observed within the foundation soils in the 15 test pits or at the contact with the Mancos Shale.
No evidence of ground water flow, seeps, springs, or damp soil on the natural slopes comprising the foundation of the spoil pile.
Surface water from areas above the fill should be diverted around the fill.
Percolation tests indicate permeability of approximately $2.5x10^{-3}$ cm/sec for in-place conditions and about $8.4x10^{-2}$ cm/sec for loose conditions.
The material should be free draining and thus pore water pressures should not develop.
Any low permeability or wet waste materialshould be scattered throughout the fill.

PROTECTION OF SURFACE AND GROUND WATER

Runoff from areas above the Excess Spoil Disposal Areas will be diverted around the disposal areas in stabilized diversion channels designed to safely pass the runoff from a 100-year, 6-hour precipitation event. Runoff from the surface of the Excess Spoil Disposal Areas will be diverted into stabilized diversion channels designed to safely pass the runoff from a 100-year, 6-hour precipitation event.

The potential for acidic leachate is minimal because of the sites selected for these permanent disposal areas. The disposal areas do not contain springs, natural or manmade watercourses, or wet weather seeps (see Appendix 9-2, Section 6.3). Under-drains will not be necessary to insure the stability of the fill. Wet waste, such as slurry, will not be disposed in the excess spoil areas. If, for any reason, water seeps out from the base of the fill, it will be contained in the perimeter ditches and diverted with the surface runoff to the existing sediment ponds.

Excess spoil that is acid- or toxic-forming or combustible and all coal mine waste placed in the disposal area will be adequately covered with four-feet of non-acid, non-toxic and non-combustible material, or otherwise treated, to control the impact on surface and groundwater, to prevent sustained combustion, and to minimize adverse effects on plant growth and the approved post-mining land use. Excess spoil that is not acid-forming nor toxic-forming nor combustible may be used to provide some, or all, of this adequate cover.

Analysis to determine the acid- and/or toxic-forming and alkalinity producing potential of the waste material disposed in the Excess Spoil Disposal Area will be performed for the constituents outlined in the Division's "Guidelines for Management of Topsoil and Overburden." The objective of this sampling program is to identify areas within the fill that may adversely impact the surface water, groundwater, plant growth, or the post-mining land use. One grab sample per acre will be taken from each four-foot lift immediately following the completion of the lift and throughout construction of the pile. Results of the sampling shall be submitted to the Division with the Quarterly Engineering Inspection Reports.

QUANTITIES

Over the life of the SCA facility, the spoil material and coal mine waste which may potentially be disposed in the Excess Spoil Disposal Areas will come from various sources. Each of these sources is discussed in detail in Appendix 9-5.

Coal Mine Waste

Breaker reject from the Bradford breaker located at the Sunnyside Mine
Material from outside sources

Low fuel potential high ash fuel reject from the crushing/screening operations

Spoil Material

West Slurry Cell dike material
Reclamation materials uncovered from the existing coarse refusepile
Fire control materials, Burned wastes within the existing refuse pile, hert materials
Sediment cleaned out of the sediment ponds

Table One of Appendix 9-5 projects the approximate quantities per year and for the life of the mine, and the approximate time each source of material will require disposal. Table Two of Appendix 9-5 summarizes the estimated quantities of material to be disposed during different periods through out the life of the mine. Modifications to this plan may still be required throughout the life of the mine as more information is gathered from the mining process.

Some spoil material (less than 15,000 yards) was placed in this area prior toSeptember 1994 in accordance with the previously submitted plan. This material has beeninspected and was adequately placed in a stable condition to meet the design criteria of this plan and the permanent program performance standards.

SUMMARY

Foundation slope no steeper than 2.8H:1V (36%)
Minimum 25 ft. setback from the crest of natural foundation slopes steeper than 2.8H:1V
Place material in horizontal lifts no deeper than four feet and compact concurrently
Sample and analyze for acid- or toxic-forming potential, one sample per acre per lift
Outer slopes of fill no steeperthan 2.5H:1V
Construct terraces on the outer slope every 25-35 feet elevation, 14 ft. wide, 0.8 ft deep, profile slope 1%-4%
Maximum height of 70 feet
Minimum surface slope of 2%
Protect against surface run-on with diversions designed for 100 yr, 6 hr precipitation event
Coal mine waste, acid-forming, toxic-forming, or combustible material will be covered with a minimum of four feet of non-acid-forming, non-toxic-forming, and non-combustible material
Regular inspections as required in R645-301-514.

EXCESS SPOIL DISPOSAL AREA #2

The northeast portion of the Permit Area is currently occupied by the Slurry Ponds #1 and #2 and the Clear Water Pond. This area has been approved as a permanent disposal area for excess spoil and coal mine waste. It has been designed with a capacity of approximately 130,000 cubic yards (See Appendix 9-7 and drawings 9-8 A-D).

This area is ideal for its proposed use because it is already a large incised hole in the existing disturbed area. Filling these holes will be the best attempt to return the area to the approximate original contours. This site is designed with a very mild outslope for positive drainage and is located in an area without high groundwater or major surface runoff flows.

Reclamation of this site is bonded for the costs of four feet of cover. At the completion of construction of this disposal area, SCA will perform reclamation with less than four feet in an attempt to demonstrate that successful reclamation can be accomplished with a lesser amount of borrow material cover. In the event that

reclamation is not successful, the additional cover will be placed to bring it up to a total of four feet and then reseed the site.

CAPACITY of the EXCESS SPOIL DISPOSAL AREAS

The design of the Excess-Spoil Disposal Area #1 has a capacity of approximately 467,800 cubic yards most of which is still available. It should be noted that the area might be compatible to allow for further expansion of the excess spoil disposal area to the east at a later date to handle additional material if necessary.

The Excess Spoil Disposal Area #2 has a capacity of approximately 130,000 cubic yards. As of the 2002 Permit Renewal, the estimated capacity remaining was approximately 75,000 cubic yards. Although this site is available for disposal for all qualified materials, it is anticipated that it will principally be used for disposal of low fuel rejects. These two Excess Spoil Disposal Areas have ample capacity to accept the material quantities projected during the Permit Term (100,000 yards rejects, 30,000 yards spoil materials).

The sites described below in "Additional Locations Considered for Excess Spoil Disposal Areas" are available to provide additional capacity for disposal of excess spoil materials in the event that excavation of the existing refuse pile encounters quantities of material beyond what is initially expected. These other areas may also provide SCA with the opportunity to selectively place different types of spoil material into different locations to the extent possible within the capacities available at the time the materials are disposed.

RECLAMATION of EXCESS SPOIL DISPOSAL AREAS

Reclamation of the Excess Spoil Disposal Areas will be in accordance with applicable DOGM regulations. The excess spoil and coal mine waste obtained over the life of SCA operations will be placed in a controlled manner to ensure that the final disposal facility will be suitable for reclamation and revegetation compatible with the natural surroundings and the approved post-mining land use. The area will be reclaimed as outlined in Chapters Nine and Ten.

ADDITIONAL LOCATIONS CONSIDERED FOR EXCESS SPOIL DISPOSAL AREAS

SCA anticipates designation of three additional sites for the disposal of excess spoil. The sites under consideration include the following: Industrial Borrow Area #1; and the Industrial Borrow Area #3 and Reclamation Borrow Area. SCA will submit a permit amendment for approval by DOGM in the event that it appears necessary to utilize additional sites because of the need for additional disposal capacity. SCA does not intend to be actively constructing various excess spoil areas concurrently without specific justification (such as separation of different types of excess spoil materials, etc.).

Construction design of the additional disposal areas will be submitted following the regulations as required. Construction is expected to be similar to the methods described above and in appendices 9-2 and 9-5. However, the locations of these additional areas are such that specific design issues to meet the requirements for structural stability, drainage concerns, approximate original contours, etc will need to be addressed in the permit amendment.

The additional sites are being considered because of the potential to use excess spoil materials to fill areas from which soil materials were or will be removed for other purposes. Filling with excess spoil could attempt to return the areas to the approximate original contours. These areas are not anticipated to be constructed with steep out-slopes or in major drainage-ways where erosion would be a serious concern. These areas may be used for excess spoil disposal following completion of their current or anticipated use.

INDUSTRIAL BORROW AREA #1

The Industrial Borrow Area #1 is located on the north edge of the permit just west of the Pasture Sediment Pond. Some borrow material was removed from this area prior to SCA's purchase of the site. Additional borrow material is available for use in contemporaneous reclamation. If this area is to be used for disposal of excess spoil materials, it could be constructed concurrently with contemporaneous reclamation which removes borrow material from the area. This spoil material could be placed in a manner which helps the area return to the approximate original contours. This area could be expanded to have the capacity to dispose of up to approximately 100,000 to 200,000 cubic yards of spoil material if needed.

INDUSTRIAL BORROW AREA #3 AND RECLAMATION BORROW AREA

These borrow areas are located on the east edge of the permit area. Some borrow material has been removed from the Industrial Borrow Area #3. Phased reclamation work throughout the life of the mine, as identified in the reclamation plan, will periodically require additional borrow material to be used until the Industrial Borrow Area #3 has consumed the entire Reclamation Borrow Area at the completion of final reclamation of the permitted area.

If this area is to be used for disposal of excess spoil materials, it could be constructed concurrently with contemporaneous reclamation which removes borrow material from the area. This spoil material could be placed in a manner which helps the area return to the approximate original contours. This area could be expanded to have the capacity to dispose of up to approximately 400,000 to 500,000 cubic yards of spoil material if needed.

9.7 BACKFILLING AND GRADING

This section discusses the backfilling and regrading that will be done during the operations plan period. Backfilling and regrading will involve redistribution of spoil material and regrading exposed surface areas that will be reclaimed. The objective of these activities is to restore the site to topographic configurations and geomorphic conditions similar to pre-mining conditions. Final grading of all areas will include blending materials into the surrounding areas and reclaiming as detailed in Plate 10-1.

As discussed under section 9.6.3, the Industrial Waste Dump was closed prior to grading the site for temporary storage of coarse and fine refuse. Additional grading was necessary to establish the storage areas. Grading was required for Storage Areas One, Two, and Four whereas Storage Area Three did not require additional grading. Grading requirements for each storage area are specified under section 9.6.3.

9.8 TOPSOIL AND BORROW MATERIAL HANDLING

Mining operations began at the Sunnyside Mines prior to implementation of topsoil salvage requirements. Therefore, borrowed soil materials will be required in most locations in order to achieve successful reclamation on areas affected by the mining operations. A complete discussion of the materials used for topsoil and borrow material is included in Chapter Two, R645-301-200, Soils.

9.8.1 Areas to Receive Topsoil or Borrow Material

Areas within the SCA Permit Area that will receive an application of topsoil or borrow material are shown in Plate 10-6 or in Plate 8-4 for Permit Term Reclamation. Areas of contemporaneous reclamation sequencing are outlined in Plate 10-3. Application of the topsoil or borrow material are outlined in Chapter 10.

9.8.2 Borrow Material Removal

Because very little topsoil has been saved during the SCC mining activities, borrow material will need to be substituted for topsoil in order to establish vegetative growth on reclaimed areas. Detailed descriptions of topsoil handling on any newly disturbed sites is discussed in R645-301-232, Topsoil and Subsoil Removal. The following discussion pertains to the borrow area removal that will be necessary for reclamation.

Approximately 375,000 cubic yards of borrow material will be needed for all reclamation activities to cover the area delineated in Plate 10-3. This borrow material will be obtained from the borrow areas outlined in Chapter Two, R645-301-224, Substitute Topsoil. The borrow material that will be utilized is the best available within the SCA Permit Area which lies close to the existing disturbed areas. Borrow material will be removed from these sites and contoured such that each acts as a catchment basin or drained to flow into the existing sediment ponds. This will be done to control run-off from each borrow area and provide water for wildlife species.

A sufficient amount of material will be left in the bottom of each borrow area for reclamation, and each borrow area will be permanently revegetated according to the procedures discussed in section 9.9. For contemporaneous revegetation efforts, the borrow area will be seeded with the approved interim seed mix if additional borrow excavation is not expected during the next year.

The borrow material stripping depths will be confirmed by qualified personnel in the field prior to actual disturbance. Salvageable topsoil will be removed from the borrow areas as described in Chapter Two, R645-301-232, Topsoil and Subsoil Removal.

9.8.3 Topsoil Storage

Detailed descriptions of topsoil handling on any newly disturbed sites is discussed in R645-301-232, Topsoil and Subsoil Removal.

9.8.4 Topsoil and Borrow Material Redistribution

The recontoured surfaces of disturbed areas that will receive borrow material or topsoil will be cleaned of waste material including any the hardpan material that may have formed between the refuse and soil layers. The sub-grade will be prepared by ripping to a prudent depth. Ripping will alleviate compaction caused by equipment and will also provide a roughened surface for bonding with the borrow material. All roadbeds will be ripped twice, once each in opposite directions.

After appropriate surface regrading and ripping is completed, borrow material will be applied. The borrow material will be distributed by end-dumping, and minimal grading will be utilized to redistribute the dumped materials sufficient to cover the reclaimed sites. The borrow materials will not be evenly distributed as to

depth, thus the materials will be unevenly distributed and result in a rough uneven surface. The small ruts and ridges will serve as catchment for water during the revegetation process. The average borrow material depths are outlined in Section 9.8.1.

On slopes greater than 2:1 the end-dumped topsoil materials will be pushed onto the slopes with a dozer and a backhoe will be used to systematically gouge depressions from four (4) to eight (8) inches deep on 30% of the slope surface or as needed to roughen smoothed surfaces. The footprints of the workers installing the erosion netting or other additional erosion control measures may also provide numerous small depressions.
Prior to seeding, the topsoil and other regraded surfaces will be disced lightly, or be scarified along the contour if a crust has developed since final grading or other soil preparation activities. Otherwise, no special soil preparation will be necessary.

9.8.5 Amendments

It is expected that the applied borrow material may require fertilizer amendments at the time of reclamation. Soil testing at the time of reclamation will be conducted according to DOGM Topsoil Guidelines to determine appropriate fertilizer rates. SCA will work with DOGM to ensure that the redistributed soils are analyzed according to DOGM Guidelines and that the tests are performed by an approved laboratory. In general, soil amendments will be applied during the fall concurrent with reseeding operations to maximize plant response.

9.9 REVEGETATION

The objective of the post-mining revegetation program is to restore the surface-disturbed area to a land use capability similar to that which existed prior to mining. The initial reclamation objectives will be to stabilize the soils and to restore the disturbed area to approximate original topographic conditions. Ultimately, the disturbed areas will be returned to their pre-mining use with watersheds in their approximate pre-mining character. In general, the long-term appearance and usefulness of the reclaimed permit area will be similar to that encountered prior to mining and also to that found in the adjacent areas that remain undisturbed by mining and related activities.

9.9.1 General Revegetation Procedures

All areas that are currently disturbed are shown on Plate 3-1, as well as those areas that will be disturbed as a result of the Mining Plan or the Reclamation Plan activities will be reclaimed according to the procedures discussed in this section. Areas of contemporaneous reclamation which will occur during the operations phase are outlined in Plate 10-3. A Final Reclamation Plan is presented in Plate 10-1 through 10-7. The general procedures outlined below will be used for all reclaimed sites. Additional details on these procedures can be found throughout this chapter and in chapter 10.

- Sub-grade shall be cleaned of waste material, scarified and pulverized before covering with topsoil or borrow material.
- Topsoil or borrow material will be spread unevenly over all areas to approximate depths as described in the final reclamation plan.
- The final grade will be blended into the existing grade with a natural finish.

- The finished grades will be left in a roughened state. On slopes less steep than 2:1, all efforts will be made during grading to conduct the last pass in the direction of the contour rather than perpendicular to the contour. The purpose of this effort will be to leave small berms to break up the slope.

- Fertilizer will be spread just prior to seeding. The fertilizermay be spread by any method that will give an even distribution.

- Areas with slopes greater than 2:1 shall be scarified to a depth of 6-inches prior to seeding.

- Final reclamation seeding must be accomplished between October 1st and November 30. All efforts will be made to plan and schedule reclamation work such that it can be completed in a time frame that allows seeding to be accomplished during this approved seeding window. If seeding is not finished during this time frame then all remaining seeding and any related reclamation work will be suspended until the following year. Areas which cannot be seeded during the seeding window will be stabilized to reduce erosion. Some acceptable methods of stabilization include: seeding with an annual grain, mulching, or netting until the seeding window has opened. However, seeding with an annual grain will not take place later in the year than September 15 for areas which are to be seeded with a permanent seed mixture that fall due to the potential competition the annual grain may have. Interim seeding may be conducted at SCA's discretion during other times during the year (such as early spring) that currently appear to show promise of success.

- For areas to be hydro-seeded the water and 15% of the wood fiber mulch and 50% of the tackifier will be mixed in the hydroseeder. The slurry will then be mixed with water at a rate of 13,000 gallons per acre and the seed will be added to the slurry. The seed/slurry mixture will be applied to form an even cover within 30 minutes of the seed being added to the slurry. Application will begin at the top of the slope and work downward. The remaining mulch and tackifier will be applied immediately following initial seeding.

- For slopes greater than 2:1, seed may be broadcast evenly over the prepared slopes by means of a hand-held seeder. Broadcasting will not be done during windy conditions or when the soil is saturated.

- All areas which are seeded will be raked or chained to provide adequate seed to soil contact.

- On slopes steeper than 2H:1V, additional erosion control measures (such as excelsior type mats) will be implemented to cover the seed bed surface and protect the barren soil surface from wind and water erosion, to increase revegetation success to meet the post-mining land use. If methods of erosion control which are more economically viable than matting are generally accepted by revegetation specialists as effective for slopes similar to what is being reclaimed, SCA will present the option to DOGM for review prior to beginning revegetation work.

- Shrub plantings will be used on a few sites to augment the shrub portion of the existing plant community and to blend in man-made features with the natural terrain. The shrub stock will be pinyon pine and juniper tublings. The tublings will be grouped and not evenly placed at a density of 200 shrubs per acre. The planting site will be saturated with water as the initial irrigation. The planting site and rooting area will be hand-cleared of all vegetative growth to reduce competition from established vegetation. SCA commits to creating six (6) areas consisting of approximately 1000 shrub plantings each as shown on Plate 10-7. These shrub plantings will occur at the time that final

reclamation work is performed in each designated area. The shrub plantings are being created for the purpose of establishing areas of cover for wildlife habitat

- Rock piles will be placed at random across the regraded site. The rock piles will be constructed from boulders obtained during borrow material excavation and will generally consist of boulders larger than one foot in diameter (ie. those easily removed during excavation). Approximately four piles will be constructed per acre until available rock materials obtained from the borrow areas are exhausted. The piles will vary in size but could average approximately 6'-10' in diameter and 3'-8' high. The rock piles are being created for the purpose of providing habitat for snakes, small mammals (marmots, ground squirrels, chipmunks and other ground dwelling rodents), etc.

9.9.2 Interim Revegetation

During the operations phase several areas will receive interim revegetation stabilization including the following:

- New berms or other new disturbances associated with the construction of sedimentation ponds or related structures including embankment tops, slopes, ditches, etc. At this time there are no new sedimentation ponds proposed.

- New topsoil piles associated with new disturbances.

- Any other areas associated within the SCA Permit Area which are judged to require interim stabilization.

These areas will be disturbed again during final reclamation activities and therefore will not receive topsoil. Because backfilling and construction of hydrologic controls will occur just prior to seeding, many of the seed beds will require no additional preparation. Furthermore, subsequent surface manipulation of these areas would demolish constructed structures.

Compacted areas will be prepared for seeding by ripping, scarifying, or discing the materials in place. All areas will then be seeded, fertilized, and mulched utilizing standard broadcast or hydroseeder methods.

For most areas requiring interim stabilization during the Mining Period, 16-16-8 fertilizer will be applied at a rate of 150 pounds per acre. Topsoil stockpiles will not be fertilized. The interim seed mix proposed for use in all areas is shown in Figure 9-1, Interim Reclamation Seed Mixture. This mix contains a combination of native and introduced species and is proposed because the species establish rapidly and effectively control erosion. Mulch will consist of a wood fiber or weed-free straw applied at a rate of one ton (1) per acre.

In addition to the benefits received from interim revegetation in terms of soil stabilization and erosion control, SCA also expects to reduce annual weedy species on topsoil piles and borrow areas through establishment of an interim perennial vegetative cover. This reduction in weedy species, and therefore a reduction in available weed seed in the area, could greatly increase the chance of permanent vegetation success. SCA will pay close attention to weed population and determine if additional weed controls are needed in accordance with section 9.11.2.

9.9.2.1 Interim Reclamation of the Third and Forth Lifts of the Coarse Refuse Pile

Revegetation on all land that is disturbed by coal mining and reclamation operations will occur as contemporaneously as practicable with mining operations, except when such mining operations are conducted in accordance with a variance for combined SURFACE and UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES issued under R645-302-280. During the life of SCA operations, interim reclamation will be accomplished as necessary or as required by the Division. Cover material will be obtained from an approved borrow material site and the depth of cover will be approved by DOGM prior to conducting contemporaneous reclamation.

Interim reclamation was performed on the third lift and the fourth lift of the coarse refuse pile in 1993 and the spring of 1994. The Division approved SCA's plan to cover the remaining portion of the third lift with two (2) feet of borrow material. The material in the designated Excess Spoil Pile site was previously approved by DOGM to use as borrow material, therefore, SCA utilized this material to cover the remainder of the third lift. There were approximately two (2) acres on the third lift which were covered with approximately 6,500 cubic yards of material. The fourth lift was covered and reseeded at the same time and in the same manner as the third lift.

The Interim Seed Mixture (Figure 9-1) was utilized for interim reclamation of the third and fourth lifts. Erosion and sediment control consisted of slope stabilization using 16-16-8 fertilizer at a rate of 150 pounds per acre and wood fiber mulch at a rate of one (1) ton per acre.

9.9.3 Seeding and Planting

All seeding will be done during the fall of the year of reclamation in order to maximize revegetation success. It should be noted, however, that seeding using the interim seed mixture may occur during other seasons if needed to control erosion or soil degradation.

The seed mix, application rate, and seeding techniques are based on reclamation experience in the area, as well as on consideration of local environmental conditions of soil, slopes, elevation, and precipitation. Use of this seed mix will result in a rapidly established and effective vegetation cover capable of minimizing erosion and meeting the goals of the reclamation program. The seed mix proposed for use in final reclamation, shown in figures 10-2, 10-3, and 10-4, is designed to reestablish a wildlife vegetative type and will be planted throughout the disturbed area. This proposed seed mix contains species well adapted to the area, and will produce a diverse, effective vegetation cover capable of self-regeneration.

Seed availability will determine the ultimate seed mixture and variety of seed used. If a variety of seed is not available, DOGM will be notified and additional seed of one of the seeds listed or another species or variety will be substituted upon approval by DOGM so that the final PLS per acre is equivalent to the proposed mix.

During final reclamation, the seed mixture will be placed by either drill seeding, hydro-seeding or by hand broadcast seeding, depending upon the slope. On steep slopes where equipment cannot be safely operated, the seed will be broadcast.

The final reclamation plan is designed to provide successful reclamation when compared with the current condition of the two reference areas. It is anticipated the required live shrub stem density can be achieved from the shrub seed currently in the seed mix. SCA commits to meeting an acceptable success standard following review of a recommended standard which has received concurrence from appropriate state and or federal agencies. DOGM has suggested that the standard for trees/shrubs be set at 1000 per acre and

composed of three shrub species of which no one species can make up more than fifty percent of the number. DOGM recommends this standard based on existing shrub densities within the region and similar standards required by other coal mines within the area. When DOGM obtains concurrence from other agencies, SCA will review recommendations and commit to a specific standard to be met.

Seed Specifications

1. Seed stock must be from the previous year's or current year's seed crops.

2. 90% Pure Live Seed (PLS).

3. All seed furnished shall be those specified in the plan and shall be measured by PLS weight. All seed shall be tested by a certified seed analyst in a duly accredited seed testing laboratory. Each speed species (variety) shall be furnished with a tag which clearly lists: (1) botanical name, (2) common name, (3) collection location and elevation, (4) pure seed (%), (5) inert matter (%), (6) other crop seed (%), (7) weed seed (%), (8) noxious weed seed, (9) germination (%), (10) hard seed (%), (11) date tested, (12) lot number, (13) net weight, (14) name of seed testing laboratory, and (15) name and address of seed company. A report of certification shall be submitted to DOGM prior to shipment. Seed shall not contain prohibited noxious weed seed as listed by state seed law. Wet, moldy, or otherwise damaged seed shall not be accepted.

4. The seeds will be delivered to the site in the fall of the year. A 30-day notice of shipment will be issued when the site is ready for seeding.

5. The seed shipment is subject to inspection by the Utah State Department of Agriculture.

6. The seeding will take place in the fall on the prepared sites after October 1st and prior to November 30th. No reclamation will take place on sites that cannot be seeded prior to November 30th. The fall seeding will allow for a period of exposure to freezing conditions and to spring moisture for the optimum germination conditions for all seed types in the mix.

9.9.4 Mulching and Soil Stabilization

Mulch decreases moisture loss, increases site stabilization, moderates soil surface temperature, and reduces wind velocity at the soil surface. All revegetated areas will be mulched with a wood fiber mulch at a rate of two (2) tons per acre. Tackified wood fiber at a rate of 120 pounds per acre will be applied for every 2000 pounds of wood fiber mulch used. Fifteen percent (15%) of the wood fiber mulch and 50% of the tackifier will be mixed in the hydroseeder with the slurry. The remaining mulch and tackifier will be applied immediately following initial seeding.

SCA recognizes its position of responsibility concerning the success of the reclamation work. SCA understands the benefits from completing reclamation work properly the first time so that the "bond clock" is not reset by requirements to replant unsuccessful areas (R645-301-357.100). SCA will use its discretion concerning minimizing the risk of unsuccessful revegetation by increasing efforts to stabilize surface areas. Some additional efforts which may be performed include the following: incorporating organic matter into the borrow material; additional mulching or erosion matting in runoff areas; additional surface roughening; etc.

9.9.5 Vegetation Success Determination

The post-mining land use is wildlife habitat. The objective is to achieve a plant cover sufficient to control erosion and provide a plant community useful as wildlife habitat. The perennial grasses and forbs growing under the moderating influence of the shrubs will stabilize the soil surface. The shrubs will provide cover for small animals. Additional wildlife enhancement features include planted pinyon pine and juniper trees.

The standard for the revegetation will be the two reference sites. In the summer of 1993 the reference sites were sampled by methods found in the DOGM Vegetation Guidelines. The results of this survey are found in Appendix 3-3.

Permanent revegetation efforts will be monitored in areas not identified as "Previously-Mined Areas" on Plate 5-7 according to the following schedule:

- First year following seeding: reconnaissance survey and qualitative evaluation of revegetation.
- Second year: qualitative and quantitative sampling of cover, frequency, and woody plant density.
- Third year: qualitative and quantitative sampling of cover, frequency, and woody plant density.
- Fourth year: qualitative evaluation only.
- Fifth year: all parameters listed during the second year.
- Sixth year: qualitative evaluation only.
- Seventh year: qualitative evaluation only.
- Eighth year: qualitative evaluation only.
- Ninth year: all parameters listed during the third year.
- Tenth year: all parameters listed during the ninth year.

During the ninth and tenth years, revegetated areas as well as the reference areas will be sampled for all parameters listed in order to test reclamation success. In the tenth year following revegetation, application for final bond release will be made.

See R645-301-350, Reclamation Performance Standards for additional information.

9.9.6 Sampling Procedures

The qualitative sampling will take place annually in the summer months. The first year will require monthly visits from April to September to closely follow the progress of the seedlings and plantings. The second year will require visits in the spring and late summer to continue tracking the progress of the seedings and plantings. The visits in years three (3) through ten (10) will occur annually in the summer or be coordinated with the quantitative sampling schedule.

The qualitative sampling will consist of visiting each reclamation area and recording growth, species success, soil conditions, erosion, livestock or wildlife use, insect damage, and other special conditions. The qualitative sampling will incorporate needs identified under the DOGM inspection program.

The quantitative sampling will take place in years two (2), three (3), five (5), nine (9) and ten (10) in the reference areas and revegetated sites. All of the measurements for cover, diversity, and woody stem densities will be taken in each year scheduled for quantitative sampling. Eighty percent of the measurements for woody stem density at bond release will be taken only from shrubs and trees that have existed for sixty (60) percent of the applicable minimum period of responsibility. The qualitative and quantitative data will be included in the annual reports.

See Chapter Three Section 301-350, Reclamation Performance Standards for additional information.

TABLE 9-4
RECLAMATION MONITORING SCHEDULE

	YEARS									
SAMPLING	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Qualitative	x	x	x	x	x	x	x	x	x	x
Quantitative										
Cover		x	x		x				x	x
Frequency		x	x		x				x	x
Woody Plant Density		x	x		[1]x		[2]x		x	x
Transplant Survival	x	x	x		x					

[1] At this time, if 80% of the standard has not been met, planting methods will be used to increase the woody plant density to the required 80%.

[2] Subsequent monitoring will occur in year seven if supplemental plantings were required in year 5. Monitoring at this time is for the purpose of determining the success rate of supplemental plantings.

9.9.7 IRRIGATION

Irrigation should not be required to establish successful vegetative growth for final reclamation. All areas will be mulched to increase germination and to improve soil moisture.

9.10 WATER TREATMENT

During the mining period the existing sediment control structures and diversion ditches will be used. This would allow the site to meet the regulatory effluent requirements and to ensure that no significant environmental damage would be caused by the operations.

9.10.1 Diversions

Plans for diversion ditches within the SCA Permit Area are discussed in Chapter Seven, Hydrology. Included in this chapter are the criteria and the designs of the ditches, culverts and sedimentation ponds required to maintain water quality in accordance with the prevailing regulations.

9.10.2 Sediment Control

The impoundments within the SCA Permit Area have been, and will continue to be used to control sediment during the operations and reclamation activities. The impoundments are discussed in Chapter Seven, sections 732, 733, 742 and 743.

Berms will also be used to control sedimentation from temporarily or permanently reclaimed areas. These berms will be used to ensure that drainage from the area in question will be treated.

9.11 MONITORING AND MAINTENANCE

This section addresses the concerns of the monitoring efforts that will take place during the mining period. This will consist of water, vegetation, and erosion monitoring activities.

9.11.1 Water

Impoundments which are subject to MSHA requirements are shown in Plate 5-7. These impoundments will be inspected weekly.

Quarterly inspections of runoff and sediment control structures not subject to MSHA, 30 CFR 77.216, will be conducted. Evidence of berm or ditch overtopping, bypass, or erosion will be noted and any needed repairs or upgrading will take place at the time of inspection or shortly after, depending on the scope of work required. The sedimentation ponds will be certified annually and the certification included in the annual report.

9.11.2 Vegetation

The establishment of weeds will be minimized by ensuring that all seed purchased is labeled in accordance with the Federal Seed Act, Section 201 (see specification in Section 9.9.3). This law limits or restricts the presence of certain noxious plant species. All seed will be tested and certified according to federal and state seed laws. Certificates of testing will be submitted to DOGM.

Mulching will be used during seeding to partially control weed emergence. Revegetation experience has shown that after a couple of years, most weeds are naturally eliminated from the reclamation stands. If weeds should become a problem, mowing may be utilized where terrain permits, SCA may choose to scarify and reseed some areas, or in extreme cases herbicides may be used.

Any necessary insect or rodent control will be guided by the U.S. Fish and Wildlife Services; The Utah State Cooperative Extensive Service; and the Animal, Plant, Health Inspection Service.

To insure the vigor of the revegetation, strict grazing management may be required to properly utilize the forage in line with wildlife requirements. If wildlife feeding becomes a problem in the first few years of plant growth, steps may be taken to restrict their use of the revegetation. Wildlife management will be coordinated with the Division of Wildlife Resources.

9.11.3 Erosion

All exposed surface areas shall be protected and stabilized to control erosion and air pollution attendant to erosion to the extent possible.

When rills or gullies deeper than 9 inches develop in areas that have been regraded and/or topsoiled, they will be filled, graded, or otherwise stabilized. The affected area will then be reseeded or replanted according to the methods described in Section 9.2. If rills or gullies less than 9 inches deep develop, they will be stabilized and reseeded if they are disruptive to post-mining land use or the reestablishment of the vegetative cover, or may result in additional erosion and sedimentation which would cause or contribute to a violation of water quality standards for receiving streams. A mixture of 3 PLS/acre of barley and 3 PLS/acre of oats will be used in order to minimize surface erosion at times of the year when the interim seed mixture is not planted.

The diversions within the Permit Area will be inspected periodically and after large storm events for signs of erosion and other irregularities which may impede flow. If necessary, maintenance will be provided which may include excavating or shaping the diversion to line, grade and cross section as required to meet the design criteria specified in Chapter 7, Hydrology.

9.11.4 Temporary Storage Areas

Maintenance of the four temporary storage areas will consist of providing general maintenance and inspections of the surrounding structures, drainages, culverts, and roads.

Water or other dust control measures will be applied as necessary to reduce dust. General road maintenance procedures will be practiced and inspections will be done as necessary. Inspections will consist of: erosion control, repair of structures and drainage systems, removal of debris in culverts and replacement of road surfacing material as needed.

9.11.5 Reporting and Emergency Procedures

If a slide occurs, Sunnyside Cogeneration Associates will telephone DOGM to notify them of the situation and recommend remedial measures to be taken to alleviate the problem. Additional remedial measures required by DOGM will be implemented.

During impoundment inspections any potential hazards noted will be reported to DOGM along with measures to be implemented to eliminate the hazard.

9.12 SCHEDULE

The different work items described in this chapter will be accomplished continually over the 30 year life of the cogeneration project.

The approximate final reclamation sequencing schedule is shown in Plate 10-3. Each year as sites of two acres or larger are permanently excavated of waste, and no longer needed for the continued operations, they will be reclaimed. SCA will notify DOGM of the areas that will be reclaimed and will commence implementation of the various portions of the reclamation plans as projected in Figure 101.

As with all areas receiving final reclamation treatment, after completing the appropriate backfilling and regrading, and drainage control in accordance with Phase I of the approved reclamation plan, the operator will request release of sixty percent of the Bond or collateral for the applicable area. After Phase II, revegetation has been established on the reclaimed land, the operator will request release of an additional amount of the Bond. At the completion of Phase III, afterthe operator has completed successfully all surface coal mining and reclamation operations, the operator will request release of the remaining portion of the Bond.

FIGURE 9-1
INTERIM RECLAMATION SEED MIXTURE

(NOT UPDATED AT THIS TIME. PLEASE SEE PREVIOUS SUBMITTAL.)

FIGURE 9-1

INTERIM SEED SCHEDULE		
SPECIES	**SEEDS/POUND**	**BROADCAST RATE #PLS/Acre**
Agropyron trichophorum pubescent wheatgrass	90,000	3.6
Agropyron trachycalum slender wheatgrass	135,000	4.8
Agropyron dasystachum thickspike wheatgrass	186,000	1.8
Elymus cinereus great basin wildrye	130,000	3.77
Saniguisorba minor small burnett	55,000	3.0
Achillea lanulosa western yarrow	4,123,635	0.1
Medicago Sativa alfalfa	16,000	2.0
TOTAL #PLS		**19.07**

CHAPTER TEN
FINAL RECLAMATION PLAN

TABLE OF CONTENTS

PLATES

TABLE 8-1

DETERMINATION OF BOND AMOUNT

DETERMINATION OF BOND AMOUNT - Summary

ITEM	QUANTITY	RATE		COST
Total Construction Management			$	66,713
Total Demolition and Removal			$	7,744
Total Erosion Control and Drainage Reconstruction			$	90,756
Total Backfill and Grading			$	763,007
Total Revegetation			$	373,238
Total (Direct Costs)			**$**	**1,301,458**
Mobilization and Demobilization	**10%**		$	130,146
Contingency	**5%**		$	65,073
Engineering Redesign	**2.5%**		$	32,536
Main Office Expense	**6.8%**		$	88,499
Project Management Fee	**2.5%**		$	32,536
Total (Indirect Costs)			**$**	**348,791**
Total (Direct and Indirect Costs - 2003 dollars)			**$**	**1,650,248**
Escalation 1.5 years to Mid Term Aug 2005	1 yr	**2.82%**	$	46,537
	0.5 yr	**1.41%**	$	23,925
Total Reclamation Costs (2007 dollars)			$	1,720,710
Bond Amount Required (Rounded to the nearest $1,000)			**$**	**1,721,000**

DETERMINATION OF BOND AMOUNT - Const Mgt, Demolition, Erosion Control

ITEM	QUANTITY	PRODUCTION RATE	HOURS REQUIRED	UNIT COST	COST
Construction Management					
Pickup Truck - Crew 4x4 1 ton	3.5 Months	174 hr/mo	609	$ 9.74	$ 5,932
5,000 Gal Water Truck - Diesel	3.5 Months	87 hr/mo	305	$ 99.61	$ 30,331
Outside Foreman	3.5 Months	174 hr/mo	609	$ 50.00	$ 30,450
Total Construction Management					**$ 66,713**
Demolition and Removal					
Demolition of crusher facilities					
Concrete - Crush and bury on site	50 Cubic Yards			$ 15.00	$ 750
Steel - Disassemble and send for scrap	100 Tons			$ 30.00	$ 3,000
Culvert excavation, removal and disposal					
Track Excavator 325 CL (av 1 cy ex per 3 ft culvert)	217 Cubic Yards	15 yd/hr	14.4	$ 141.53	$ 2,044
Disposal	650 LF			$ 3.00	$ 1,950
Total Demolition and Removal					**$ 7,744**
Erosion Control and Drainage Reconstruction					
Jute Mesh (stapled) (Means 02370 550 0100)	5,000 square yards			$ 1.03	$ 5,150
Silt fences (Means 02370 550 1100)	300 Linear Feet			$ 0.97	$ 291
Drainage Channel Reconstruction					
Major Channels with riprap and filter bed	1,700 Linear Feet	1.76 cy/lf			
Material cost (means 02370 300 0100)	2,992 cubic yards			$ 18.75	$ 56,100
Equipment and Labor	2,992 cubic yards	180 yd/hr	16.6	$ 141.53	$ 2,353
Minor Channels requiring riprap	2,500 Linear Feet	0.55 cy/lf			
Material cost (means 02370 300 0100)	1,375 cubic yards			$ 18.75	$ 25,781
Equipment and Labor	1,375 cubic yards	180 yd/hr	7.6	$ 141.53	$ 1,081
Total Erosion Control and Drainage Reconstruction					**$ 90,756**

DETERMINATION OF BOND AMOUNT - Backfill and Grading

ITEM	QUANTITY	PRODUCTION RATE	HOURS REQUIRED	UNIT COST	COST
Backfilling and Grading					
General site grading: High walls, Refuse Cleanup and Drainage needs					
D-10 R Dozer	200,000 Cubic Yards	1,800 cy/hr	111	$ 279.61	$ 31,068
Disturbed area covered with refuse (4' borrow)	75.9 Acres				
C-651 E Scraper	489,808 Cubic Yards	400 cy/hr	1225	$ 306.67	$ 375,524
D-10 R Dozer (one dozer to assist loading four scrapers)			306	$ 279.61	$ 85,597
Disturbed area w/ 2' existing cover over refuse (2' additional borrow)	14.1 Acres				
C-651 E Scraper	45,367 Cubic Yards	400 cy/hr	113	$ 306.67	$ 34,782
D-10 R Dozer (one dozer to assist loading four scrapers)			28	$ 279.61	$ 7,928
D-10 R Dozer (spreading on hillside)	45,367 Cubic Yards	375 cy/hr	121	$ 279.61	$ 33,827
Disturbed area contaminated by refuse (1.5 ' borrow)	45.2 Acres				
C-651 E Scraper	109,481 Cubic Yards	400 cy/hr	274	$ 306.67	$ 83,936
D-10 R Dozer (one dozer to assist loading four scrapers)			68	$ 279.61	$ 19,132
D-10 R Dozer (minor spreading in some hillside areas - 25%)	27,370 Cubic Yards	700 cy/hr	39	$ 279.61	$ 10,933
Old Coarse Refuse Road - Bonded Earthwork Amount (40% of 4' borrow)	5.5 Acres				
C-651 E Scraper	14,197 Cubic Yards	400 cy/hr	35	$ 306.67	$ 10,885
D-10 R Dozer (one dozer to assist loading four scrapers)			9	$ 279.61	$ 2,481
D-10 R Dozer (spreading on hillside)	14,197 Cubic Yards	375 cy/hr	38	$ 279.61	$ 10,586
Distribution of salvaged topsoil	6 Acres				
D-10 R Dozer	8,685 Cubic Yards	375 cy/hr	23	$ 279.61	$ 6,476
Scarification (average 18" depth)	199 Acres				
D-10 R Dozer with multishank ripper	481,580 Cubic Yards	3,000 cy/hr	161	$ 310.56	$ 49,853
Total Backfill and Grading					**$ 763,007**

DETERMINATION OF BOND AMOUNT - Revegetation

ITEM	QUANTITY	UNIT COST	COST
Atriplex Grass Revegetation Areas			
Seed Material Costs (Granite Seed)	17.5 Acres	$ 407.50	$ 7,131
Application (Hydroseeding - Equip and Labor) B-81	762 MSF	$ 19.85	$ 15,132
Pinyon Jumiper Sagebrush Revegetation Areas			
Seed Material Costs (Granite Seed)	183.8 Acres	$ 635.05	$ 116,722
Application (Hydroseeding - Equip and Labor) B-81	8,006 MSF	$ 19.85	$ 158,926
Hydrophytic Revegetation Areas			
Seed Material Costs (Granite Seed)	0.6 Acres	$ 267.50	$ 161
Application (Hydroseeding - Equip and Labor) B-81	26 MSF	$ 19.85	$ 519
Subtotal Revegetation	201.9 Acres		$ 298,590
Reseeding 25%	50.5 Acres		$ 74,648
Total Revegetation			$ 373,238

TABLE 8-2

EQUIPMENT RENTAL RATE COSTS AND PRODUCTION RATES

EQUIPMENT PRODUCTION

(Caterpillar Performance Handbook)

CAT 651 E SCRAPER	
Slope ranges	2% - 6%
Haul Distance Ranges	1500-3000 ft (one way)
Production	400 - 600 bank cubic yards / hour
CAT D 10 R DOZER	
100 ft ave dozing distance	1800 loose cubic yards / hour
300 ft ave dozing distance	700 loose cubic yards / hour
600 ft ave dozing distance	375 loose cubic yards / hour
MULTISHANK RIPPER on D 10 DOZER	
Seismic Velocity Rate for Topsoil	3000 ft/sec
Production (ideal conditions)	3000 BCY/hr
Track Excavator 325 CL	2 yard bucket
Cycle time	0.4 minutes
Riprap Placement efficiency	60%
Riprap production rate	180 yds/hour
Culvert Ex: 10% eff, 1 yd bucket	15 yds/hour

Equipment Costs

Based on 2003 Blue Book Rental Rate Guide

	Monthly Equipment Cost (176 hr/mo)	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Total Hourly Cost
Standard Crawler Dozer Caterpillar D10R Semi EROPS (9-43) (3Q02)	$ 22,155	$ 83.45	10%	$ 49.35	$ 279.61
Single Engine Conventional Scrapper Caterpillar 651E EROPS (9-39) (3Q02)	$ 23,395	$ 101.00	10%	$ 49.35	$ 306.67
Multi-Shank Ripper Multi-Shank Ripper 520-699 P (9-47) (3Q00)	$ 3,165	$ 10.15	10%		$ 30.95
Off-Highway Water Truck 5,000 gal H2O truck Diesel (20-6) (2Q02)	$ 4,895	$ 27.15	10%	$ 39.15	$ 99.61
On-Highway Light Duty Truck Gasoline Powered Pickup Truck Crew 4x4 1 ton (20-6) (2Q02)	$ 880	$ 3.85	10%	$ -	$ 9.74
Track Excavator Caterpillar 325 CL (2Q02)	$ 9,205	$ 31.50	10%	$ 49.35	$ 141.53

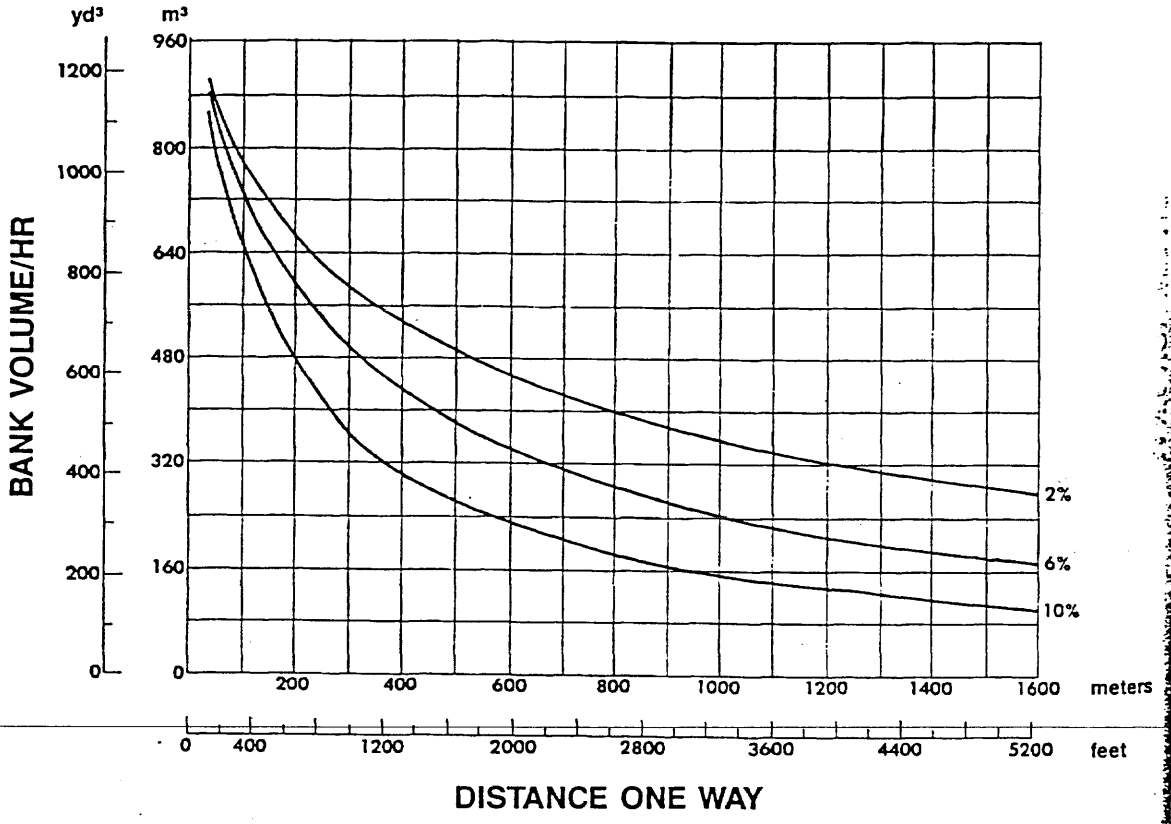
Drainage Channel Reconstruction

Name of lined channel	Minor Channels (riprap)		Major Channels (Riprap & Filter bed)	
	Slope > %	Length req	Slope > %	Length req
Past-RD3	3.5	600	n/a	-
Past-RD6	3.7	90	6.8	500
CRT-RD1	3.7	-	n/a	-
CRT-RD2	8	120	22	100
RC-RD1	4	90	7.5	-
RC-RD3	2.5	-	3.8	270
RC-RD4	5	60	n/a	-
RC-RD6	2	-	4.5	100
RC-RD8	2	-	4	200
RC-RD11	2.4	170	3.6	530
OCRR-RD1	5.6	370	n/a	-
OCRR-RD4	4	200	n/a	-
BOR-RD2	2.7	800	n/a	-
Total Length of lined channels		2500		1700

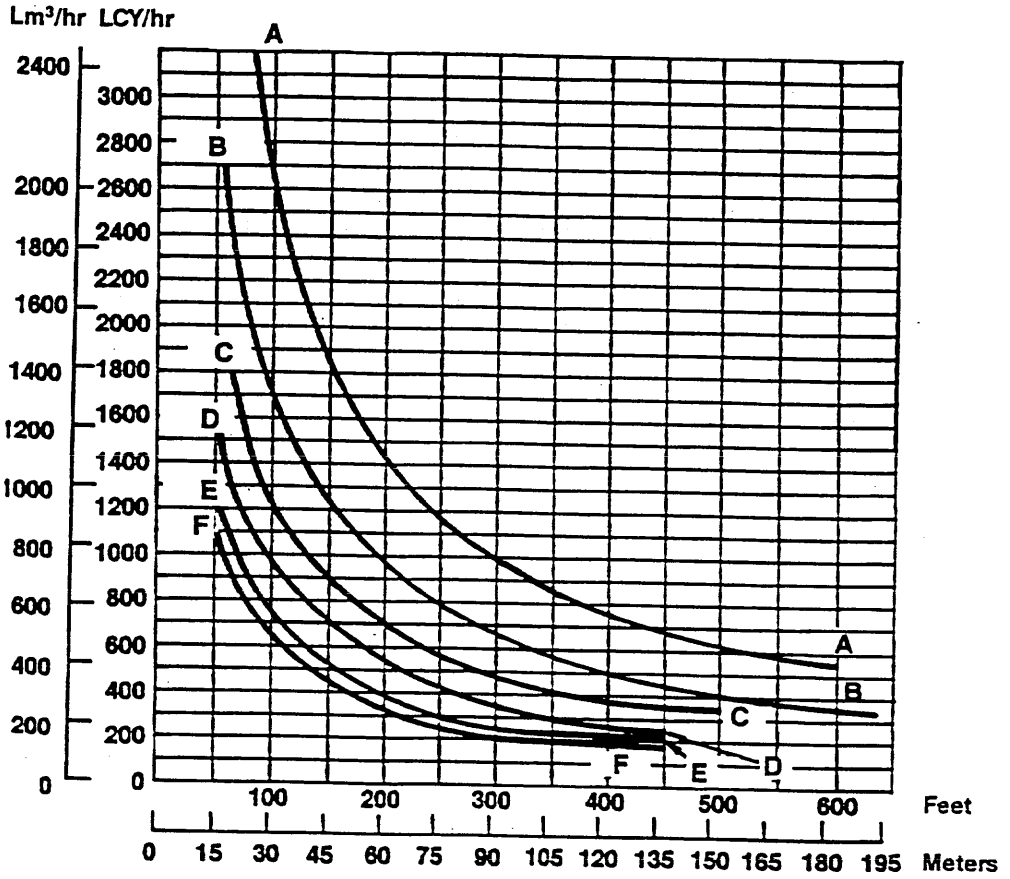
DISTANCE vs. PRODUCTION

CONDITIONS: Flat haul. Percentages shown are rolling resistance only.
100% efficiency (60 min hour).

- Material: 1780 kg/m³ (3,000 lb/yd³).
- Payload: 47 200 kg, 26.5 Bm³ (104,056 lb, 34.6 BCY).
- Empty weight: 60 950 kg (134,370 lb).
- Fixed time: 1.3 min.



ESTIMATED DOZING PRODUCTION • Universal Blades • D7G through D11N



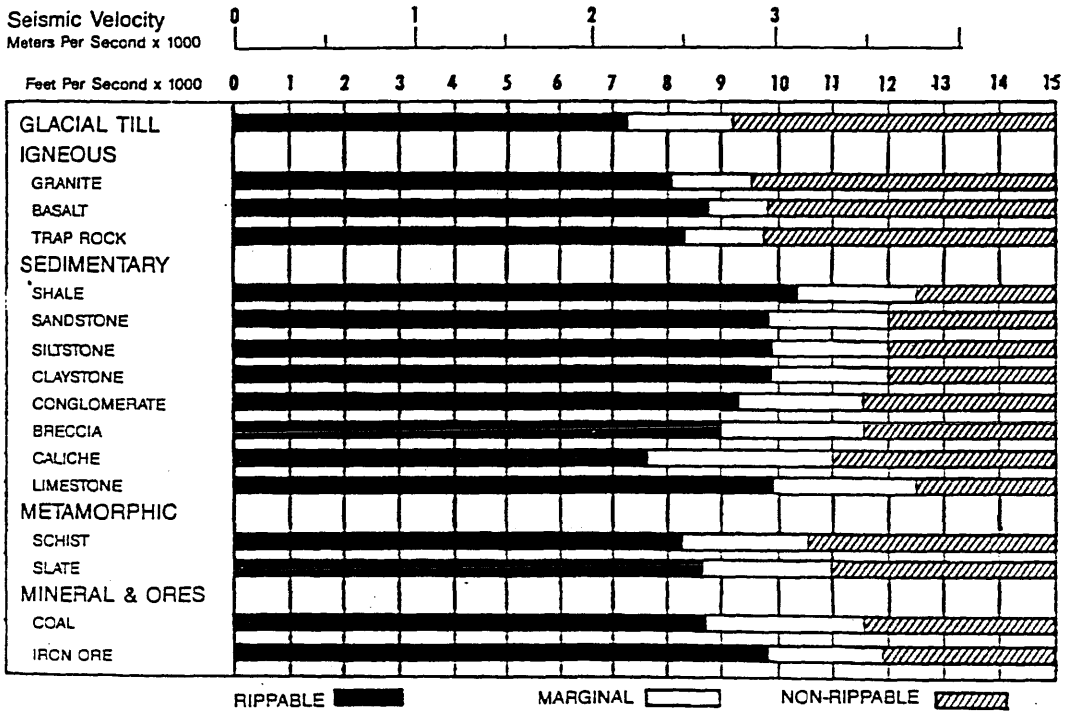
AVERAGE DOZING DISTANCE

KEY
A — D11N-11U
B — D10N-10U
C — D9N-9U
D — D8N-8U
E — D7H-7U
F — D7G-7U

NOTE: This chart is based on numerous field studies made under varying job conditions. Refer to correction factors following these charts.

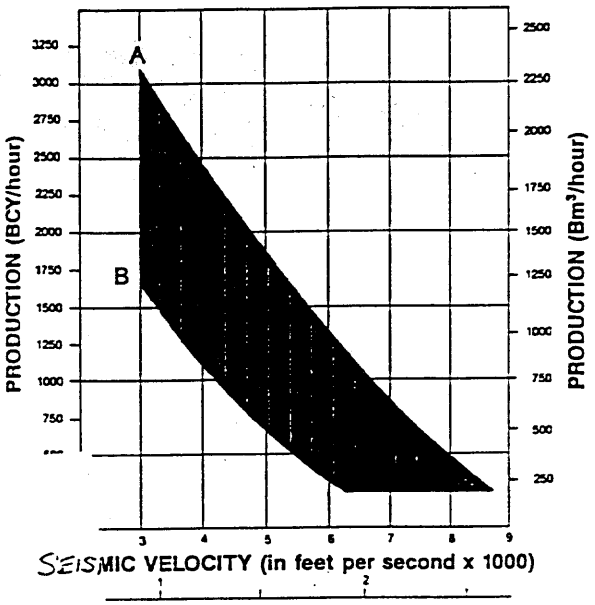
D10N

- **Single Shank Impact Ripper**
- **Estimated by Seismic Wave Velocities**

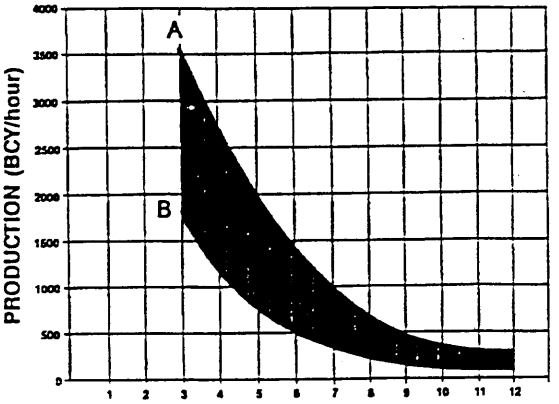


Estimated Ripper Production Graphs
• D10N • D11N

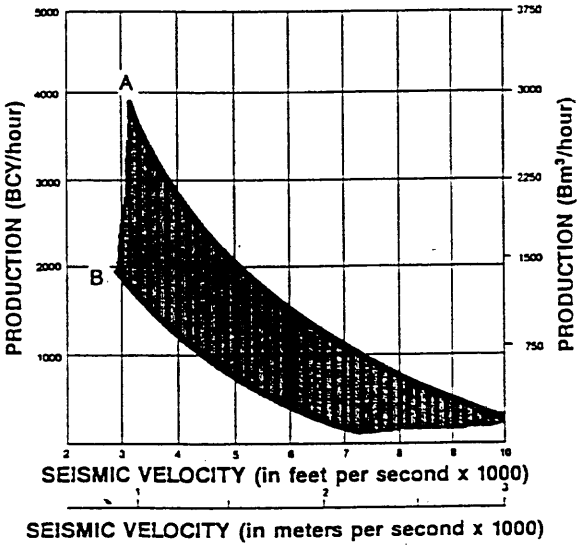
D10N WITH SINGLE SHANK



D10N WITH IMPACT RIPPER



D11N WITH SINGLE SHANK



KEY
A — IDEAL
B — ADVERSE

SCA REPORT
WATER QUALITY MONITORING PLAN
Monitoring Period: March 1996 - May 2002

APPENDIX 7-10

SCA REPORT
WATER QUALITY MONITORING PLAN
Monitoring Period: March 1996 - May 2002

APPENDIX 7-10

SCA Report
Water Quality Monitoring Plan
Monitoring Period: March 1996 – May 2002

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EXECUTIVE SUMMARY

SCA collected the required water quality samples and field parameter data during the monitoring period of March 1996 through May 2002 in accordance with the program outlined in Appendix 7-8 of the Mining and Reclamation Permit. This monitoring plan included quarterly collection of water quality samples and field parameter data at six monitoring locations:

Icelander Creek (ICE-1)
Columbia Dugway Spring (F-2)
Coarse Refuse Seep Source (CRS)
Coarse Refuse Seep Boundary (CRB)
Dragerton Well (Well-1)
Borehole B-6 (B-6)

Water quality data from this monitoring period was compared with the baseline data (see Appendix 7-4 for the baseline data summary). This report consists of a summary and interpretation of the water quality monitoring data and a comparison of the water quality parameters of each location with the Baseline data gathered in 1993 through 1995. The following evaluations of the monitoring data were made:

- Two of the monitoring locations (Borehole B-6 and Coarse Refuse Seep CRS) did not have water discharges available for sampling during the entire monitoring period.
- Individual water quality parameters (field and laboratory data) were analyzed for each monitoring location. The variations in data appeared similar to those encountered during baseline monitoring period. No new trends were identified which would indicate a change in water quality.
- Stiff diagrams were prepared for each monitoring session at each location. These were compared with stiff diagrams prepared for the baseline data. These diagrams identifying chemistry types appear generally similar with no changes being identified that would represent detrimental impacts to the water quality in the area.

The SCA mining operations do not have any discharges to surface waters (other than occasional detention pond releases that are controlled by UPDES requirements). There are no contaminating groundwater interactions. The extensive monitoring that has been conducted by SCA over the past ten years indicates that the operations of SCA have had positive improvements to water quality in the area (slurry water is no longer filtering through the refuse pile as in the historic SCC operations) and no detrimental water quality changes have been detected. Therefore, it does not appear necessary to continue the frequent sampling and analysis of the surface and ground water monitoring locations as has been conducted heretofore.

DATA ANALYSIS

The quarterly field-parameter data collected by SCA during the monitoring period is presented in Table 1. SCA collected quarterly water quality samples from March 1996 through May 2002, which were then sent to Utah certified laboratories. The analytical laboratory results of the water samples taken by SCA are summarized in Table 2.

Statistical analysis of the data collected by SCA is itemized in Table 3. The statistical parameters include minimum, average, standard deviation, and the total number of samples available.

Field Data

The field parameter data as well as the laboratory results contain significant trends in the different types of water parameters. Figures 1 through 5 are graphs that compare the temperature, specific conductivity, dissolved oxygen and total dissolved solids of each of the monitoring sites over the monitoring period of 1996-2002. The following observations can be made from the graphs:

- The temperatures are similar to that of the Baseline data are consistent with the seasonal temperatures;
- The average dissolved oxygen of the monitoring sites are within a half of the standard deviation from the Baseline. The ICE-1, F-2, and WELL-1 monitoring sites are slightly lower, and the CRB sites is slightly higher than the Baseline data range;
- The Specific Conductivity of the monitoring sites is very comparable to the Baseline data.
- The elevated values of specific conductivity (and total dissolved solids) for the CRB are similar to the baseline data and may be the result of water percolating through the Mancos Shale.
- The pH measured at the monitoring sites has remained consistent with the Baseline data. None of the measurements taken by SCA indicated a pH of less than 7.1.

Analytical Data

To facilitate the evaluation of different water chemistry types present and to look for any changes in water chemistry at each location over time, the major ion data for the quarterly sampling by SCA were plotted on Stiff diagrams and individual parameters were plotted as line graphs. The line graphs are included as Figures 6-10. The Stiff diagram plots are included as Figures 11 through 14.

A review of the Stiff plots indicates two distinct groupings of water chemistry noted by the following trends:

- The Icelander Creek (ICE-1), Columbia Dugway Spring (F-2), and the Dragerton Well (WELL-1) seem to have similar water chemistry. They have a balanced chemistry of Sodium and Sulfate and moderate amounts of Magnesium, consistent with the baseline data Stiff diagrams.
- The samples taken from the Coarse Refuse Seep Boundary (CRB) again contain water rich in sulfate, magnesium, and calcium. This is similar to the Baseline data.
- Although the Icelander Creek is a surface water location, its two main inflows of water come from F-2 and CRB. Even though the CRB water contains elevated levels, it does not appear to adversely change the ICE-1 water quality in comparison with F-2 and Well-1.

Field Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Monitoring Location	Date	Location I.D.	Temp. (C)	pH (su)	SC (umhos)	Dissolved Oxygen (mgl)	Flow Rate (gpm)	Flow Method
Icelander Creek	3/12/1996	ICE-1	7.7	7.68	1990	6.2	29	3
	5/22/1996		15.6	8.51	1890	6	13	3
	9/9/1996		NW	NW	NW	NW	NW	NW
	11/21/1996		NW	NW	NW	NW	NW	NW
	2/19/1997		NW	NW	NW	NW	NW	NW
	5/14/1997		NW	NW	NW	NW	NW	NW
	8/19/1997		19.5	7.75	2140	8	25	NW
	11/20/1997		10.1	8.26	2358	8.7	40	2
	3/16/1998		5	7.54	2170	8.2	20	2
	6/4/1998		12.4	8.61	1900	8	65	2
	9/4/1998		19.8	8.14	1570	8	90	2
	12/8/1998		0.4	8.59	1650	11	20	2
	3/2/1999		1.3	8.69	1730	8.6	20	2
	5/25/1999		9	8.71	1680	9	20	2
	9/8/1999		12.6	8.22	1610	8.2	30	2
	12/7/1999		0.5	8.7	1590	9	28	2
	3/6/2000		0.4	8.75	1589	9.1	34	2
	6/6/2000		15.3	8.26	1840	8.2	20	2
	9/11/2000		19.8	8.15	1585	8	15	2
	11/27/2000		NW/F	NW/F	NW/F	NW/F	NW/F	2
	3/5/2001		NW/F	NW/F	NW/F	NW/F	NW/F	2
	5/31/2001		9.2	8.73	1680	9	35	2
	9/6/2001		19.5	7.89	2200	8	30	2
	3/14/2002		NW/F	NW/F	NW/F	NW/F	NW/F	2
	5/22/2002		NW/F	NW/F	NW/F	NW/F	NW/F	2
Columbia Dugway Spring	3/12/1996	F-2	5.9	8.52	1930	6.6	22.5	2
	5/22/1996		12.2	8.27	1620	6.9	10	2
	9/9/1996		13.4	8.45	2190	7.3	4.2	2
	11/21/1996		7.3	8.52	2350	8.9	20	2
	2/19/1997		8.1	8.41	2240	8.1	25	2
	5/14/1997		10.7	8.28	2280	9.1	21	2
	8/19/1997		16.4	7.7	2000	7.6	30	2
	11/20/1997		10.3	8.46	2410	9.3	58	2
	3/16/1998		4.9	8.56	1760	8.3	30	2
	6/4/1998		13.3	8.49	1900	8	80	2
	9/4/1998		19.2	7.92	1570	7.8	100	2
	12/8/1998		1	8.61	1700	10.9	15	2
	3/2/1999		6.4	8.5	1820	8.2	30	2
	5/25/1999		11	8.46	1720	8.2	40	2
	9/8/1999		14	8	1640	8.4	35	2
	12/7/1999		4.4	8.8	1510	8.9	45	2
	3/6/2000		0.8	8.78	1521	9.1	48	2
	6/6/2000		12.6	8.04	1800	7.9	30	2
	9/11/2000		19.2	7.92	1580	8.9	20	2
	11/27/2000		2.3	8.01	1490	8.6	15	2
	3/5/2001		6.4	8.5	1820	8.2	15	2
	5/31/2001		11	8.53	1780	8.1	40	2
	9/6/2001		17.8	7.83	2160	7.6	40	2
	3/14/2002		6	8.61	1835	8.1	30	2
	5/22/2002		11	8.36	1801	8.3	18	2
Course Refuse Seep Source	3/12/1996	CRS	ND	ND	ND	ND	ND	ND
	5/22/1996		ND	ND	ND	ND	ND	ND
	9/9/1996		ND	ND	ND	ND	ND	ND
	11/21/1996		NA	NA	NA	NA	NA	NA
	2/19/1997		NA	NA	NA	NA	NA	NA
	5/14/1997		NA	NA	NA	NA	NA	NA
	8/19/1997		NA	NA	NA	NA	NA	NA
	11/20/1997		NA	NA	NA	NA	NA	NA
	3/16/1998		NA	NA	NA	NA	NA	NA
	6/4/1998		NA	NA	NA	NA	NA	NA
	9/4/1998		NA	NA	NA	NA	NA	NA
	12/8/1998		NA	NA	NA	NA	NA	NA
	3/2/1999		NA	NA	NA	NA	NA	NA
	5/25/1999		NA	NA	NA	NA	NA	NA
	9/8/1999		NA	NA	NA	NA	NA	NA
	12/7/1999		NA	NA	NA	NA	NA	NA
	3/6/2000		NA	NA	NA	NA	NA	NA
	6/6/2000		NA	NA	NA	NA	NA	NA
	9/11/2000		NA	NA	NA	NA	NA	NA
	11/27/2000		NA	NA	NA	NA	NA	NA
	3/5/2001		NA	NA	NA	NA	NA	NA
	5/31/2001		NA	NA	NA	NA	NA	NA
	9/6/2001		NA	NA	NA	NA	NA	NA
	3/14/2002		NA	NA	NA	NA	NA	NA
	5/22/2002		NA	NA	NA	NA	NA	NA

Field Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Monitoring Location	Date	Location I.D.	Temp. (C)	pH (su)	SC (umhos)	Dissolved Oxygen (mgl)	Flow Rate (gpm)	Flow Method
Coarse Refuse Seep Boundary	3/12/1996	**CRB**	10	8.26	5150	6.6	18	1
	5/22/1996		13.8	8.11	4680	8.6	12	1
	9/9/1996		15.8	8.51	5460	6.2	12	2
	11/21/1996		9.1	8.86	5340	8.6	20	2
	2/19/1997		8.6	8.32	5360	8.4	22	2
	5/14/1997		14.1	7.68	5300	8.1	16	2
	8/19/1997		25	7.1	5170	7.1	25	2
	11/20/1997		9.1	8.1	5500	8.3	35	2
	3/16/1998		10	8.26	4800	7.9	25	2
	6/4/1998		11.2	8.13	4910	7.5	22	2
	9/4/1998		19.3	7.6	5060	7	30	2
	12/8/1998		3.3	8.13	4770	10	15	2
	3/2/1999		2.6	8.23	4810	10.8	24	2
	5/25/1999		7.5	8.05	4700	8.8	30	2
	9/8/1999		11.7	7.75	4860	8	30	2
	12/7/1999		1.3	8.51	4610	8.7	25	2
	3/6/2000		1	8.56	4620	8.9	25	2
	6/6/2000		13.3	7.73	4970	8.1	20	2
	9/11/2000		15.1	8.75	5060	9.1	15	2
	11/27/2000		NW/F	NW/F	NW/F	NW/F	NW/F	2
	3/5/2001		NW/F	NW/F	NW/F	NW/F	NW/F	2
	5/31/2001		7.8	7.98	4750	8.7	20	2
	9/6/2001		25	7.53	5080	7.3	15	2
	3/14/2002		NW/F	NW/F	NW/F	NW/F	NW/F	2
	5/22/2002		7.5	8.21	5120	8.1	15	MW/F
Dragerton Well	3/12/1996	**Well-1**	12	7.55	2180	2.9	not runnng	NA
	5/22/1996		12.1	7.48	2130	2.3	220	4
	9/9/1996		15.2	7.98	1910	5.1	150	4
	11/21/1996		11.1	7.26	920	5	150	4
	2/19/1997		12.1	7.31	1920	4.1	150	4
	5/14/1997		12.9	7.83	720	8	OFF	4
	8/19/1997		12.9	7.83	720	8	OFF	4
	11/20/1997		7.9	8.36	1380	7.4	125	4
	3/16/1998		10.6	7.73	1380	8.1	150	4
	6/4/1998		11.3	7.75	900	8	250	4
	9/4/1998		15.5	7.13	1270	7.8	250	4
	12/8/1998		7.6	7.78	1090	9.9	125	4
	3/2/1999		10.1	7.45	1110	6.9	225	4
	5/25/1999		14.9	7.44	1190	6.5	125	4
	9/8/1999		14.7	7.27	1440	7.8	125	4
	12/7/1999		8.9	7.75	300	8.4	125	4
	3/6/2000		8	7.85	401	8.6	150	4
	6/6/2000		13.4	7.25	1079	6.8	200	4
	9/11/2000		14.7	7.88	1380	9	250	4
	11/27/2000		2	7.91	1295	9.1	250	4
	3/5/2001		10.1	7.51	1120	6.9	250	4
	5/31/2001		12.9	7.83	720	8.2	125	4
	9/6/2001		17.6	7.49	1395	8.3	125	4
	3/14/2002		11.1	7.54	1120	7.9	250	4
	5/22/2002		15	7.59	1130	7.8	0	4
Borehole B-6	3/12/1996	**B-6**	NW	NW	NW	NW	NW	NW
	5/22/1996		NW	NW	NW	NW	NW	NW
	9/9/1996		NW	NW	NW	NW	NW	NW
	11/21/1996		NW	NW	NW	NW	NW	NW
	2/19/1997		NW	NW	NW	NW	NW	NW
	5/14/1997		NW	NW	NW	NW	NW	NW
	8/19/1997		NW	NW	NW	NW	NW	NW
	11/20/1997		NW	NW	NW	NW	NW	NW
	3/16/1998		NW	NW	NW	NW	NW	NW
	6/4/1998		NW	NW	NW	NW	NW	NW
	9/4/1998		NW	NW	NW	NW	NW	NW
	12/8/1998		NW	NW	NW	NW	NW	NW
	3/2/1999		NW	NW	NW	NW	NW	NW
	5/25/1999		NW	NW	NW	NW	NW	NW
	9/8/1999		NW	NW	NW	NW	NW	NW
	12/7/1999		NW	NW	NW	NW	NW	NW
	3/6/2000		NW	NW	NW	NW	NW	NW
	6/6/2000		NW	NW	NW	NW	NW	NW
	9/11/2000		NW	NW	NW	NW	NW	NW
	11/27/2000		NW	NW	NW	NW	NW	NW
	3/5/2001		NW	NW	NW	NW	NW	NW
	5/31/2001		NW	NW	NW	NW	NW	NW
	9/6/2001		NW	NW	NW	NW	NW	NW
	3/14/2002		NW	NW	NW	NW	NW	NW
	5/22/2002		NW	NW	NW	NW	NW	NW

Notes:
NA - no flow
NW - no water present
NW/F - no water present, frozen
nd - data is not available due to lack of discharge
1- Flow rates were measured using a weir
2- Flow rates were measured using a calibrated container and stopwatch method
3- Flow rates were measured using the floating debris method
4- Flow rates were measured using a meter

Analytical Parameter Data

March 1996 - May 2002

DOGM Permit Boundary Water Quality Monitoring Plan

Analytical Paramaters											
		Metals (mg/l)				Inorganics (mg/l)					Ions
Sample Location	Date	Iron Total	Iron Dissolved	Manganese Total	Manganese Dissolved	Electrical Conductivity	Oil & Grease	Setteable Solids	Dissolved Solids	Suspended Solids	C-A Balance
ICE-1	3/12/1996	0.513	<0.01	0.014	0.02	2180	<5	0.2	1280	15	20.5/21.3
	5/22/1996	0.37	0.01	0.01	<0.01	1890	<5	0.5	1360	27	20.8/21.4
	9/9/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/21/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	2/19/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/14/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	8/19/1997	0.31	0.11	0.05	0.04	720	6	<0.1	1430	3	23.78/22.83
	11/20/1997	0.13	0.07	<0.01	<0.01	2358	<5	<0.1	1190	6	16.72/15.76
	3/16/1998	0.141	<0.02	0.04	<0.01	2170	<5	<0.1	1570	4	20.03/25.01
	6/4/1998	0.17	0.02	<0.01	<0.01	1900	<5	<0.1	1310	11	21.7/22.61
	9/4/1998	0.57	0.15	<0.01	<0.01	1570	<5	<0.1	1070	25	15.8/16.99
	12/8/1998	0.05	0.03	<0.01	<0.01	1650	<5	<0.1	1190	4	18.6/19.7
	3/2/1999	0.11	0.03	<0.01	<0.01	1730	<5	<0.1	984	10	14.99/16.96
	5/25/1999	0.16	0.03	<0.01	<0.01	1680	<5	<0.1	1180	6	18.26/19.45
	9/8/1999	0.16	0.02	<0.01	<0.01	1610	<5	<0.1	1140	9	16.28/18.13
	12/11/1999	0.19	0.05	<0.01	<0.01	1590	<6	<0.1	1100	8	18.04/18.31
	3/6/2000	0.29	0.03	0.01	<0.01	1589	<7	<0.1	1150	16	15.73/17.3
	6/6/2000	<0.1	<0.1	<0.1	<0.1		<2	<0.4	1092	<5	
	9/11/2000	0.4	<0.1	<0.1	<0.1		<2	<0.4	1107	27	
	5/31/2001	<0.1	<0.1	<0.1	<0.1		<2	<0.2	1154	<5	
	9/6/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	990	8	
	11/19/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	3956	<5	
	3/14/2002	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	
	5/22/2002	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	

Note:
A < sign indicates the value reported was the practical quantitation limit for this sample using the method described.
NA - not applicable
ND - no discharge
NW - no water

Analytical Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Sample Location	Date	Analytical Paramaters									
		Anions (mg/l)					Cations (mg/l)				
		Bicarbonate Alkalinity	Carbonate Alkalinity	Total Alkalinity	Chloride as Cl	Sulfate as SO4	Calcium as Ca	Hardness as CaCO3	Magnesium as Mg	Potassium as K	Sodium as Na
ICE-1	3/12/1996	514	15	448	46	553	62.8	528	86.2	4	223
	5/22/1996	541	21	478	50	498	56.2	516	95.3	4.8	231
	9/9/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/21/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	2/19/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/14/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	8/19/1997	571	<1		50	580	71.7	578	82.1	5	306
	11/20/1997	448	7	380	30	353	68.8	471	74.6	3.7	162
	3/16/1998	496	<1	407	60	729	88.6	696	91.1	6.1	183
	6/4/1998	528	14	456	46	585	84.4	591	94.9	4.6	210
	9/4/1998	522	16	455	30	339	56.4	427	76	4.7	164
	12/8/1998	638	<1	523	31	400	68.7	531	83.3	3.4	188
	3/2/1999	531	<1	435	30	356	60	442	71	2.5	140
	5/25/1999	499	10	425	41	470	66	540	91	3.3	170
	9/8/1999	543	4	453	31	395	55	463	79	2.9	160
	12/11/1999	575	<1	472	28	389	66	479	78	3.2	180
	3/6/2000	523	<1	429	29	380	56	440	77	3	150
	6/6/2000	485	12	418	30	465	63	520	88	3	181
	9/11/2000	517	15	448	29	440	53	486	86	4	193
	5/31/2001	508	9	432	32	539	72	559	92	3	188
	9/6/2001	518	18	455	26.2	387	48	445	79	3	176
	11/19/2001	533	9	452	22.7	377	54	481	84	3	175
	3/14/2002	NW/F	NW/F	NW/F	NW/F		NW/F	NW/F	NW/F	NW/F	NW/F
	5/22/2002	NW/F	NW/F	NW/F	NW/F		NW/F	NW/F	NW/F	NW/F	NW/F

Analytical Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

March 1996 - May 2002

Analytical Paramaters											
		Metals (mg/l)				Inorganics (mg/l)					Ions
Sample Location	Date	Iron Total	Iron Dissolved	Manganese Total	Manganese Dissolved	Electrical Conductivity	Oil & Grease	Setteable Solids	Dissolved Solids	Suspended Solids	C-A Balance
F-2	3/12/1996	0.17	0.02	0.02	0.04	1930	<5	0.1	1220	4	ND
	5/22/1996	0.25	0.02	0.03	0.03	1620	<5	<0.1	1230	<2.5	21.1/21.2
	9/9/1996	0.14	0.15	0.04	0.04	1930	<6	<0.1	1590	<2.5	28.5/26.8
	11/21/1996	0.3	0.02	0.04	0.03	2350	<5	<0.1	1570	3	28.0/25.6
	2/19/1997	0.23	0.04	0.03	0.02	2240	<5	<0.1	1620	<2.5	26.6/28.2
	5/14/1997	0.49	0.19	0.04	0.03	2280	<5	<0.1	1620	4	25.75/24.73
	8/19/1997	0.04	0.04	<0.01	0.02	2000	76	<0.1	1340	3	22.49/21.90
	11/20/1997	0.4	0.08	0.02	0.02	2410	<5	<0.1	1100	1	13.39/13.12
	3/16/1998	0.15	0.03	0.02	0.02	1760	<5	<0.1	1220	<1	18.81/20.78
	6/4/1998	0.41	0.04	0.02	0.01	1900	<5	<0.1	1330	9	20.71/22.64
	9/4/1998	0.21	0.13	0.03	0.03	1570	<5	<0.1	1060	2	16.34/17.18
	12/8/1998	0.05	0.02	<0.01	<0.01	1700	<5	<0.1	1160	5	20.0/20.4
	3/2/1999	0.05	0.02	0.01	<0.01	1820	<5	<0.1	1030	<1	16.19/18.23
	5/25/1999	0.15	0.04	0.02	0.02	1720	<5	<0.1	820	3	18.59/20.07
	9/8/1999	0.12	0.03	0.02	0.02	1640	<5	<0.1	1140	5	18.36/20.0
	12/11/1999	0.11	0.04	0.02	0.02	1510	<6	<0.1	1020	2	17.59/17.52
	3/6/2000	0.14	0.02	0.02	0.01	1521	<6	<0.1	1120	2	17.8/17.76
	6/6/2000	0.3	<0.1	<0.1	<0.1		<2	<0.4	1115	5	
	9/11/2000	<0.1	<0.1	<0.1	<0.1		<2	<0.4	1096	<5	
	11/27/2000	<0.1	<0.1	<0.1	<0.1		<2	<0.4	187	<5	
	3/5/2001	<0.1	<0.1	<0.1	<0.1		<2	<0.4	1184	<5	
	5/31/2001	0.2	<0.1	<0.1	<0.1		<2	<0.2	1156	<5	
	9/6/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	847	<5	
	11/19/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	1009	<5	
	3/14/2002	<0.1	<0.1	<0.05	<0.05		<2	<0.1	986	<5	
	5/22/2002	0.2	<0.1	<0.05	<0.05		<2	<0.1	1056	<5	

Note:
A < sign indicates the value reported was the practical quantitation limit for this sample using the method described.
NA - not applicable
ND - no discharge
NW - no water

Analytical Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Sample Location	Analytical Paramaters										
		Anions (mg/l)					Cations (mg/l)				
	Date	Bicarbonate Alkalinity	Carbonate Alkalinity	Total Alkalinity	Chloride as Cl	Sulfate as SO4	Calcium as Ca	Hardness as CaCO3	Magnesium as Mg	Potassium as K	Sodium as Na
F-2	3/12/1996	551	12	471	42	485	73.3	525	79	3.4	209
	5/22/1996	576	12	493	47	480	74.7	545	88.8	3.5	230
	9/9/1996	676	<1	554	64	667	107	698	127	4	290
	11/21/1996	643	<1	528	70	626	117	818	122	4	275
	2/19/1997	570	<1	467	63	823	116	773	117	4	255
	5/14/1997	547	7	461	72	648	119	773	100	3.5	264
	8/19/1997	619	<1		42	508	79.2	570	77.7	3.5	277
	11/20/1997	458	8	389	26	308	62.2	449	71.4	3.3	148
	3/16/1998	554	3	459	42	501	76.1	578	83.1	3.1	186
	6/4/1998	576	10	488	46	556	95.7	589	95.7	4.3	203
	9/4/1998	584	13	501	27	308	74.4	503	77	3.4	157
	12/8/1998	633	<1	519	32	439	68.2	560	88.7	4.2	212
	3/2/1999	556	<1	456	33	393	72	480	73	2.6	150
	5/25/1999	546	3	453	41	474	83	578	90	3.3	160
	9/8/1999	601	<1	493	30	447	78	561	85	3.1	170
	12/11/1999	565	<1	464	25	363	74	460	78	3	170
	3/6/2000	547	<1	449	29	383	72	470	82	2.6	170
	6/6/2000	532	14	459	29	453	82	559	86	3	173
	9/11/2000	590	<5	484	17	265	73	520	82	3	177
	11/27/2000	591	<5	484	29	436	80	579	92	5	187
	3/5/2001	567	<5	465	32	547	120	703	98	3	193
	5/31/2001	555	7	467	29	477	86	577	88	3	179
	9/6/2001	589	8	496	22.9	338	69	485	76	3	164
	11/19/2001	583	<5	478	19.8	339	74	514	80	2	163
	3/14/2002	551	7	464	23	388	71	503	79	3	161
	5/22/2002	571	<5	475	24	392	71	515	82	3	167

Analytical Parameter Data

March 1996 - May 2002

DOGM Permit Boundary Water Quality Monitoring Plan

Analytical Paramaters											
		Metals (mg/l)				Inorganics (mg/l)					Ions
Sample Location	Date	Iron Total	Iron Dissolved	Manganese Total	Manganese Dissolved	Electrical Conductivity	Oil & Grease	Setteable Solids	Dissolved Solids	Suspended Solids	C-A Balance
CRS	3/12/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/22/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/9/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/21/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	2/19/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/14/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	8/19/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/20/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/16/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	6/4/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/4/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/8/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/2/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/25/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/8/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/11/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/6/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	6/6/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/11/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/27/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/5/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/31/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/6/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/19/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/14/2002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/22/2002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Note:
A < sign indicates the value reported was the practical quantitation limit for this sample using the method described.
NA - not applicable
ND - no discharge
NW - no water

Analytical Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Sample Location	Date	Analytical Paramaters									
		Anions (mg/l)					Cations (mg/l)				
		Bicarbonate Alkalinity	Carbonate Alkalinity	Total Alkalinity	Chloride as Cl	Sulfate as SO4	Calcium as Ca	Hardness as CaCO3	Magnesium as Mg	Potassium as K	Sodium as Na
CRS	3/12/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/22/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/9/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/21/1996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	2/19/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/14/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	8/19/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/20/1997	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/16/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	6/4/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/4/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/8/1998	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/2/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/25/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/8/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/11/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/6/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	6/6/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/11/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/27/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/5/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/31/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	9/6/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/19/2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3/14/2002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	5/22/2002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Analytical Parameter Data

March 1996 - May 2002

DOGM Permit Boundary Water Quality Monitoring Plan

Analytical Paramaters											
		Metals (mg/l)				Inorganics (mg/l)					Ions
Sample Location	Date	Iron Total	Iron Dissolved	Manganese Total	Manganese Dissolved	Electrical Conductivity	Oil & Grease	Setteable Solids	Dissolved Solids	Suspended Solids	C-A Balance
CRB	3/12/1996	0.06	<0.01	0.04	0.05	5150	<5	<0	5030	4	69.5/73.2
	5/22/1996	0.07	<0.01	0.04	0.04	4880	<5	<0.1	5080	<2.5	73.5/67.9
	9/9/1996	<0.02	<0.02	0.01	<0.01	5150	<6	<0.1	5400	<2.5	81.8/78.8
	11/21/1996	0.12	<0.02	0.12	0.08	5340	<5	<0.1	4860	4	71.4/65.1
	2/19/1997	<0.02	<0.02	0.02	0.01	5360	<5	<0.1	4950	3	68.4/71.5
	5/14/1997	0.02	<0.02	0.02	0.02	5300	<5	<0.1	5040	<2.5	67.24/66.60
	8/19/1997	0.09	<0.02	<0.01	<0.02	5170	<5	<0.01	5060	<1	68.92/74.82
	11/20/1997	<0.02	<0.02	0.02	0.01	5500	<5	<0.1	5020	4	67.86/68.67
	3/16/1998	0.12	<0.02	0.01	<0.01	4800	<5	<0.1	4720	15	60.41/67.62
	6/4/1998	0.04	<0.02	0.02	0.02	4910	<5	<0.1	4910	2	61.79/63.45
	9/4/1998	0.88	0.35	0.08	0.08	5060	<5	0.2	4950	25	61.19/68.23
	12/8/1998	0.03	<0.02	0.04	0.03	4770	<5	<0.1	4810	4	64.5/69.4
	3/2/1999	<0.02	<0.02	<0.01	<0.01	4810	<5	<0.1	4710	2	55.70/60.52
	5/25/1999	<0.02	<0.02	0.01	0.01	4700	<5	<0.1	4610	4	58.48/65.24
	9/8/1999	0.79	<0.02	0.21	0.16	4860	<5	0.5	4710	105	56.18/61.13
	12/11/1999	<0.02	<0.02	0.01	0.01	4610	<6	<0.1	4460	2	53.42/59.51
	3/6/2000	<0.02	<0.02	<0.01	<0.01	4620	<8	<0.1	4700	3	61.45/62.79
	6/6/2000	<0.1	<0.1	<0.1	<0.1		<2	<0.4	5109	<5	
	9/11/2000	<0.1	<0.1	0.2	0.1		<2	<0.4	5215	5	
	5/31/2001	<0.1	<0.1	<0.1	<0.1		<2	<0.2	4893	<5	
	9/6/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	5392	<5	
	11/19/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	5020	8	
	3/14/2002	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	
	5/22/2002	<0.1	<0.1	<0.05	<0.05		<2	<0.1	5084	<5	

Note:
A < sign indicates the value reported was the practical quantitation limit for this sample using the method described.
NA - not applicable
ND - no discharge
NW - no water

Analytical Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Sample Location	Analytical Paramaters										
		Anions (mg/l)					Cations (mg/l)				
	Date	Bicarbonate Alkalinity	Carbonate Alkalinity	Total Alkalinity	Chloride as Cl	Sulfate as SO4	Calcium as Ca	Hardness as CaCO3	Magnesium as Mg	Potassium as K	Sodium as Na
CRB	3/12/1996	391	<1	321	212	2920	425	2510	285	224	440
	5/22/1996	411	<1	337	196	2670	472	2540	324	33	515
	9/9/1996	421	<1	346	195	3190	547	2660	360	32	554
	11/21/1996	441	<1	362	183	2530	486	2610	302	27	496
	2/19/1997	415	<1	340	168	2880	449	2400	297	24	481
	5/14/1997	397	<1	325	167	2660	449	2470	283	24.5	481
	8/19/1997	400	<1		169	3050	412	2420	254	20.8	619
	11/20/1997	390	<1	320	156	2780	476	2340	286	23.5	459
	3/16/1998	399	<1	327	143	2740	417	2250	261	19.8	405
	6/4/1998	390	<1	320	148	2540	424	2150	266	21.3	419
	9/4/1998	389	<1	319	141	2780	433	2190	270	20.8	390
	12/8/1998	449	<1	368	124	2810	448	2080	266	20.1	454
	3/2/1999	389	<1	319	126	2430	380	1960	240	18	380
	5/25/1999	368	<1	302	121	2680	410	2050	250	19	390
	9/8/1999	427	<1	350	118	2440	390	1960	240	17	380
	12/11/1999	425	<1	349	121	2360	360	1940	230	17	370
	3/6/2000	391	<1	321	124	2540	410	1870	260	18	440
	6/6/2000	367	<5	308	125	2868	474	2411	298	22	506
	9/11/2000	418	<5	343	140	3065	449	2328	293	22	507
	5/31/2001	386	<5	316	131	2916	438	2255	282	21	487
	9/6/2001	396	<5	325	140.5	3317	443	2370	307	21	552
	11/19/2001	387	<5	317	144.3	2890	454	2427	314	24	522
	3/14/2002	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F	NW/F
	5/22/2002	370	<5	304	119	3031	418	2324	311	22	500

Analytical Parameter Data

March 1996 - May 2002

DOGM Permit Boundary Water Quality Monitoring Plan

Analytical Paramaters											
		Metals (mg/l)				Inorganics (mg/l)					Ions
Sample Location	Date	Iron Total	Iron Dissolved	Manganese Total	Manganese Dissolved	Electrical Conductivity	Oil & Grease	Setteable Solids	Dissolved Solids	Suspended Solids	C-A Balance
WELL-1	3/12/1996	0.015	<0.01	<0.0026	0.03	2180	<5	<0.1	1220	<2.5	19.7/20.8
	5/22/1996	0.09	<0.01	<0.01	<0.01	2130	<5	<0.1	1040	4	18.4/17.0
	9/9/1996	0.31	0.18	<0.01	0.03	2180	<6	0.1	1370	4	12.4/12.2
	11/21/1996	<0.02	<0.02	<0.01	<0.01	920	73	NA	381	NA	8.66/7.84
	2/19/1997	0.06	<0.02	<0.01	<0.01	1920	<5	<0.1	508	<2.5	9.46/8.82
	5/14/1997	0.13	<0.02	<0.01	<0.01	720	<5	<0.1	400	<2.5	8.26/7.64
	8/19/1997	<0.02	<0.02	<0.01	<0.01	1400	<5	<0.1	924	<1.2	15.90/14.67
	11/20/1997	0.03	<0.02	<0.01	<0.01	1380	<5	<0.1	1100	1	13.39/13.12
	3/16/1998	0.17	<0.02	<0.01	<0.01	1380	<5	<0.1	868	2	14.57/15.8
	6/4/1998	<0.02	0.08	<0.01	<0.01	900	<5	<0.1	684	<1.2	11.86/12.62
	9/4/1998	<0.02	0.02	<0.01	<0.01	1270	<5	<0.1	820	<1	12.75/13.64
	12/8/1998	<0.02	<0.02	<0.01	<0.01	1090	<6	<0.1	724	<1	10.9/12.1
	3/2/1999	0.1	0.05	<0.01	<0.01	1110	<5	<0.1	872	<1	13.52/15.27
	5/25/1999	0.13	0.03	<0.01	<0.01	1190	<5	<0.1	820	3	13.13/13.56
	9/8/1999	0.08	<0.02			1440	<5	NA	1070	NA	16.22/17.53
	12/11/1999	0.02	<0.02	<0.01	<0.01	300	7	NA	900	NA	14.92/14.70
	3/6/2000	0.28	0.04	<0.01	<0.01	401	<5	NA	1010	NA	14.77/15.21
	6/6/2000	0.2	<0.1	<0.1	<0.1		<2	NA	759	NA	
	9/11/2000	0.4	<0.1	<0.1	<0.1		<2	NA	788	NA	
	11/27/2000	<0.1	<0.1	<0.1	<0.1		<2	<0.4	786	<5	
	3/5/2001	1.4	<0.1	<0.1	<0.1		<2	<0.4	472	<5	
	5/31/2001	<0.1	<0.1	<0.1	<0.1		<2	<0.2	733	<5	
	9/6/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	727	<5	
	11/19/2001	<0.1	<0.1	<0.05	<0.05		<2	<0.1	777	<5	
	3/14/2002	<0.1	<0.1	<0.05	<0.05		<2	<0.1	769	<5	
	5/22/2002	<0.1	<0.1	<0.05	<0.05		<2	NA	1035	NA	

Note:

A < sign indicates the value reported was the practical quantitation limit for this sample using the method described.

NA - not applicable

ND - no discharge

NW - no water

Analytical Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Sample Location	Analytical Paramaters										
		Anions (mg/l)					Cations (mg/l)				
	Date	Bicarbonate Alkalinity	Carbonate Alkalinity	Total Alkalinity	Chloride as Cl	Sulfate as SO4	Calcium as Ca	Hardness as CaCO3	Magnesium as Mg	Potassium as K	Sodium as Na
WELL-1	3/12/1996	602	<1	493	30	485	79.4	462	69.5	3.4	228
	5/22/1996	543	<1	445	23	360	77.3	450	69.6	3.6	200
	9/9/1996	453	<1	372	14	208	82.7	364	56.6	2	81.1
	11/21/1996	357	<1	293	7	86	49.4	303	49.9	<2	47.9
	2/19/1997	369	<1	303	7	124	57.9	350	50.7	<2	55.2
	5/14/1997	359	<1	295	6	76	52.7	303	45.3	2.2	42.5
	8/19/1997	519	<1		20	269	58.5	383	47.4	2.9	207
	11/20/1997	470	<1	385	16	239	62.6	370	53.5	2.9	133
	3/16/1998	528	<1	433	18	318	60	386	52.6	2.8	165
	6/4/1998	477	<1	391	13	213	54.5	322	46.4	2.6	123
	9/4/1998	501	<1	411	19	235	59.6	363	52	2.9	126
	12/8/1998	451	<1	370	13	210	54.1	372	46.3	2.2	100
	3/2/1999	513	<1	421	19	304	60	368	53	2.7	140
	5/25/1999	496	<1	407	14	242	61	371	53	2.5	130
	9/8/1999	459	<1	376	56	405	61	548	96	2.2	120
	12/11/1999	509	<1	417	19	290	51	313	45	2.2	110
	3/6/2000	517	<1	424	18	299	65	352	60	2.4	150
	6/6/2000	489	<5	401	12	232	60	356	50	2	135
	9/11/2000	482	<5	395	16	264	60	372	54	3	134
	3/5/2001	388	<5	318	5	129	65	352	46	3	53
	5/31/2001	502	<5	412	11	220	60	372	54	2	123
	9/6/2001	491	<5	403	17.9	249	60	360	51	2	119
	11/19/2001	485	<5	398	15.3	249	66	404	58	3	124
	3/14/2002	500	<5	410	17	263	68	417	60	2	122
	5/22/2002	460	<5	377	69	390	63	569	100	2	134

Analytical Parameter Data

March 1996 - May 2002

DOGM Permit Boundary Water Quality Monitoring Plan

Analytical Paramaters											
		Metals (mg/l)				Inorganics (mg/l)					Ions
Sample Location	Date	Iron Total	Iron Dissolved	Manganese Total	Manganese Dissolved	Electrical Conductivity	Oil & Grease	Setteable Solids	Dissolved Solids	Suspended Solids	C-A Balance
B-6	3/12/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/22/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/9/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/21/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	2/19/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/14/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	8/19/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/20/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/16/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	6/4/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/4/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	12/8/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/2/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/25/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/8/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	12/11/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/6/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	6/6/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/11/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/27/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/5/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/31/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/6/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/19/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/14/2002	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/22/2002	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW

Note:
A < sign indicates the value reported was the practical quantitation limit for this sample using the method described.
NA - not applicable
ND - no discharge
NW - no water

Analytical Parameter Data

DOGM Permit Boundary Water Quality Monitoring Plan

Sample Location	Analytical Paramaters										
		Anions (mg/l)					Cations (mg/l)				
	Date	Bicarbonate Alkalinity	Carbonate Alkalinity	Total Alkalinity	Chloride as Cl	Sulfate as SO4	Calcium as Ca	Hardness as CaCO3	Magnesium as Mg	Potassium as K	Sodium as Na
B-6	3/12/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/22/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/9/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/21/1996	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	2/19/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/14/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	8/19/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/20/1997	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/16/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	6/4/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/4/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	12/8/1998	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/2/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/25/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/8/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	12/11/1999	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/6/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	6/6/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/11/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/27/2000	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/5/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/31/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	9/6/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	11/19/2001	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	3/14/2002	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
	5/22/2002	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW

SUNNYSIDE COGENERATION ASSOCIATES
SURFACE AND GROUND WATER SITES MONITORING - FIELD DATA
MONITORING - FIELD DATA

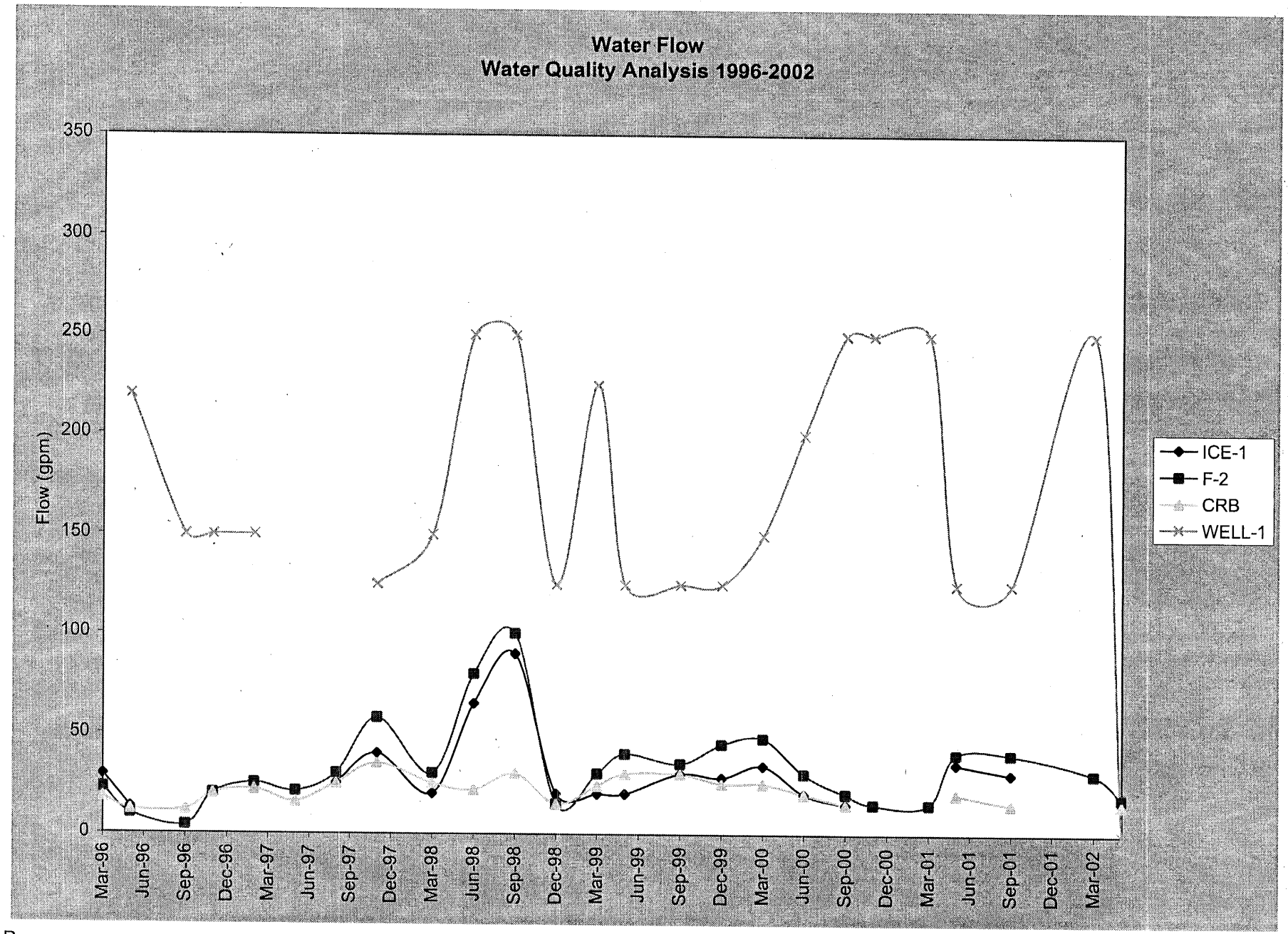
	Minimum	Average	Maximum	Sta. Dev.	No. of Samples
ICE-1					
Flow Rate	13.0	31.4	90.0	19.33	17
Temperature	0.4	10.5	19.8	7.17	17
pH	7.5	8.3	8.8	0.40	17
Spec. Cond	720	1741	2358	403.3	13
Dissolved Oxygen	6.0	8.3	11.0	1.11	17
F-2, Whitmore Springs					
Flow Rate	4.2	32.9	100.0	21.51	25
Temperature	0.8	9.8	19.2	5.31	25
pH	7.7	8.3	8.8	0.30	25
Spec. Cond	1510	1877	2410	293.1	17
Dissolved Oxygen	6.6	8.3	10.9	0.86	25
CRB					
Flow Rate	12.0	21.4	35.0	6.37	22
Temperature	1.0	11.0	25.0	6.54	22
pH	7.1	8.1	8.9	0.42	22
Spec. Cond	4610	4999	5500	276.2	17
Dissolved Oxygen	6.2	8.2	10.8	1.05	22
WELL-1					
Flow Rate	0	171.4	250	65.41	22
Temperature	2	11.8	17.6	3.31	25
pH	7.13	7.6	8.36	0.28	25
Spec. Cond	300	1289	2180	570.3	17
Dissolved Oxygen	2.3	7.2	9.9	1.90	25

SUNNYSIDE COGENERATION ASSOCIATES
SURFACE AND GROUND WATER SITES
MONITORING - LAB DATA

	ICE-1					F-2, Columbia Dugway Spring				
	Minimum	Average	Maximum	Sta. Dev.	# of Samples	Minimum	Average	Maximum	Sta. Dev.	# of Samples
Aluminum										
Arsenic										
Boron										
Cadmium										
Copper										
Iron D	<0.01	0.05	0.15	0.04	18	0.02	<0.1	0.19	<0.1	26
Iron T	<0.1	0.25	0.57	0.16	18	0.04	0.21	0.49	0.12	26
Lead										
Manganese Dissolved	<0.01	<0.01	0.04	0.01	18	<0.01	<0.1	<0.1	<0.1	26
Manganese Total	<0.01	0.025	0.05	0.02	18	<0.01	<0.1	<0.1	<0.1	26
Molybdenum										
Potassium	2.5	3.73	6.1	0.96	18	2	3.34	5	0.62	26
Selenium										
Zinc										
Electric Conductivity	720	1741	2358	403	13	1510	1877	2410	293	17
Oil and Grease	<2	<4.4	6	2.20	18	<2	<4	<6	2.00	26
Sulfide										
Settleable solids	<0.1	<0.1	0.5	<0.2	18	<0.1	<0.15	<0.4	<.1	26
Dissolved Solids	984	1347.4	3956	668.0	18	187	1147	1620	292	26
Suspended Solids	3	11.93	27	8.33	18	<1	<3	9	<3	26
Bicarbonate Alkalinity	448	527.2	638	40.3	18	458	574	676	41	26
Carbonate Alkalinity	<1	8.5	21	4.89	18	<1	6	14	4	26
Total Alkalinity	380	445.06	523	31.30	17	389	477	554	31	25
Chloride	22.7	35.66	60	10.39	18	17	37	72	15	26
Sulfate	339	458	729	105.0	18	265	463	823	127	26
Calcium	48	64	88.6	10.7	18	62.2	83	120	17	26
Hardness as CaCO3	427	511	696	67.2	18	449	573	818	100	26
Magnesium	71	84	95.3	7.3	18	71.4	88	127	14	26
Sodium	140	188	306	37.6	18	148	196	290	43	26
Ammonia										
Nitrite										
Nitrate										
Phosphorous										

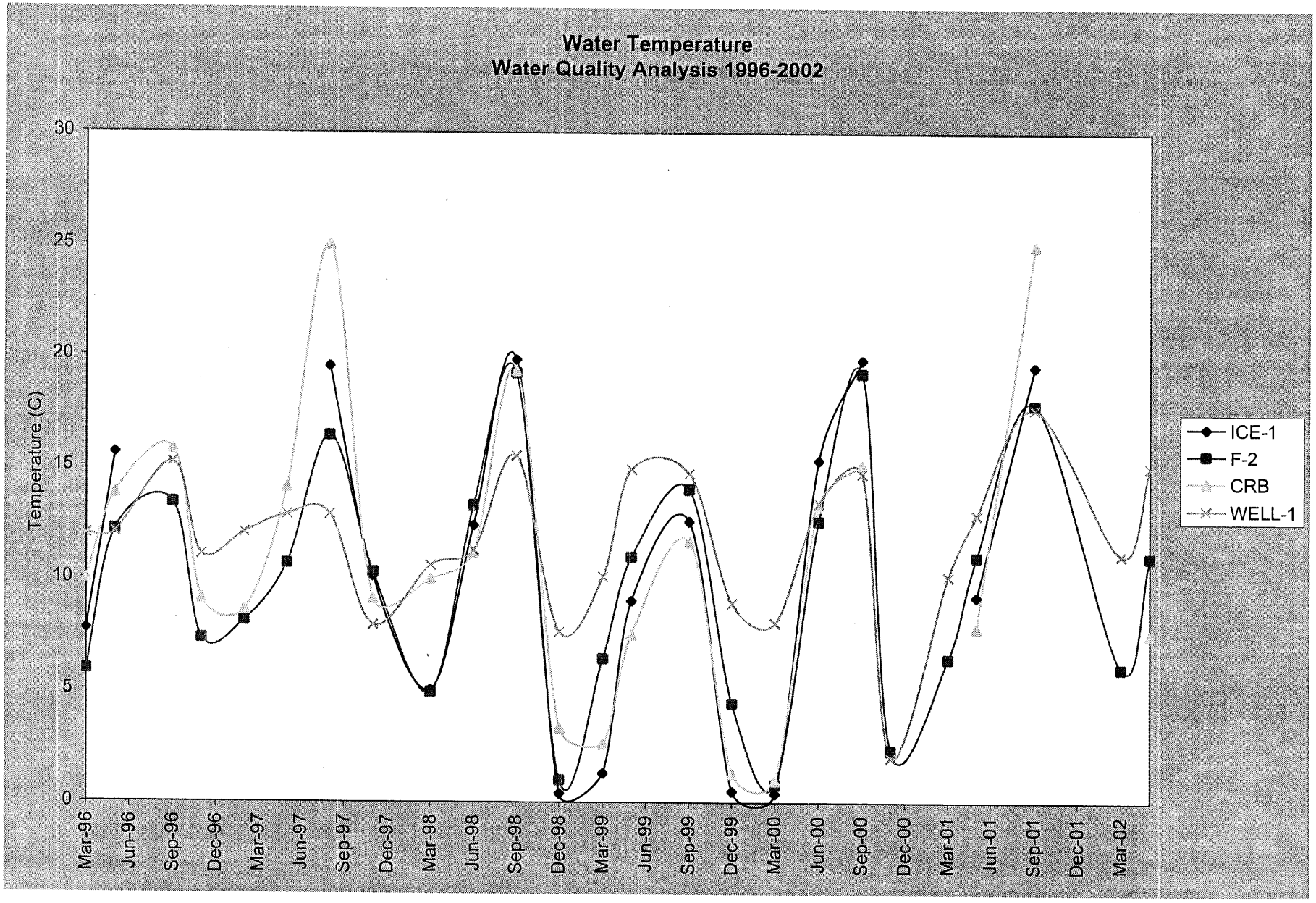
SUNNYSIDE COGENERATION ASSOCIATES
SURFACE AND GROUND WATER SITES
MONITORING - LAB DATA

	CRB					WELL-1				
	Minimum	Average	Maximum	Sta. Dev.	# of Samples	Minimum	Average	Maximum	Sta. Dev.	# of Samples
Aluminum										
Arsenic										
Boron										
Cadmium										
Copper										
Iron D	<0.01	<0.02	0.35	<0.1	23	<0.01	<0.1	0.18	<0.1	26
Iron T	<0.02	0.26	0.88	0.33	23	<0.02	<0.1	0.31	<.1	26
Lead										
Manganese Dissolved	<0.01	0.05	0.16	0.05	23	<0.01	<0.1	<0.05	<0.1	26
Manganese Total	<0.01	0.06	0.21	0.07	23	<0.01	<0.1	<0.1	<0.1	26
Molybdenum										
Potassium	17	30.95	224	42.28	23	2	2.54	3.6	0.49	25
Selenium										
Zinc										
Electric Conductivity	4610	4999	5500	276	17	300	1289	2180	570	17
Oil and Grease	<2	<4	<6	2	23	<2	<4	7	2	25
Sulfide										
Settleable solids	<0.1	<0.1	0.5	<0.1	23	<0.1	<0.15	<0.4	<.1	26
Dissolved Solids	4460	4945	5400	232	23	381	829	1370	236	26
Suspended Solids	2	13	105	26	23	<1	<3	<5	<3	19
Bicarbonate Alkalinity	367	401	449	22	23	357	477	602	58	25
Carbonate Alkalinity	<1	<1	<5	<1	23	<1	<2	<5	<2	25
Total Alkalinity	302	329	368	18	22	293	390	493	48	24
Chloride	118	148	212	28	23	5	19	69	14	25
Sulfate	2360	2786	3317	250	23	76	254	485	95	25
Calcium	360	438	547	39.3	23	49.4	62	82.7	8	25
Hardness as CaCO3	1870	2283	2660	224.2	23	303	383	569	65	25
Magnesium	230	282	360	30.9	23	45	57	100	14	25
Sodium	370	467	619	65.1	23	42.5	124	228	46	25
Ammonia										
Nitrite										
Nitrate										
Phosphorous										



Psomas
Field Parameters Page 1

Figure 1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15
10
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Jun-96
Sep-96
Dec-96
Mar-97
Jun-97
Sep-97
Dec-97
Mar-98
Jun-98
Sep-98
Dec-98
Mar-99
Jun-99
Sep-99
Dec-99
Mar-00
Jun-00
Sep-00
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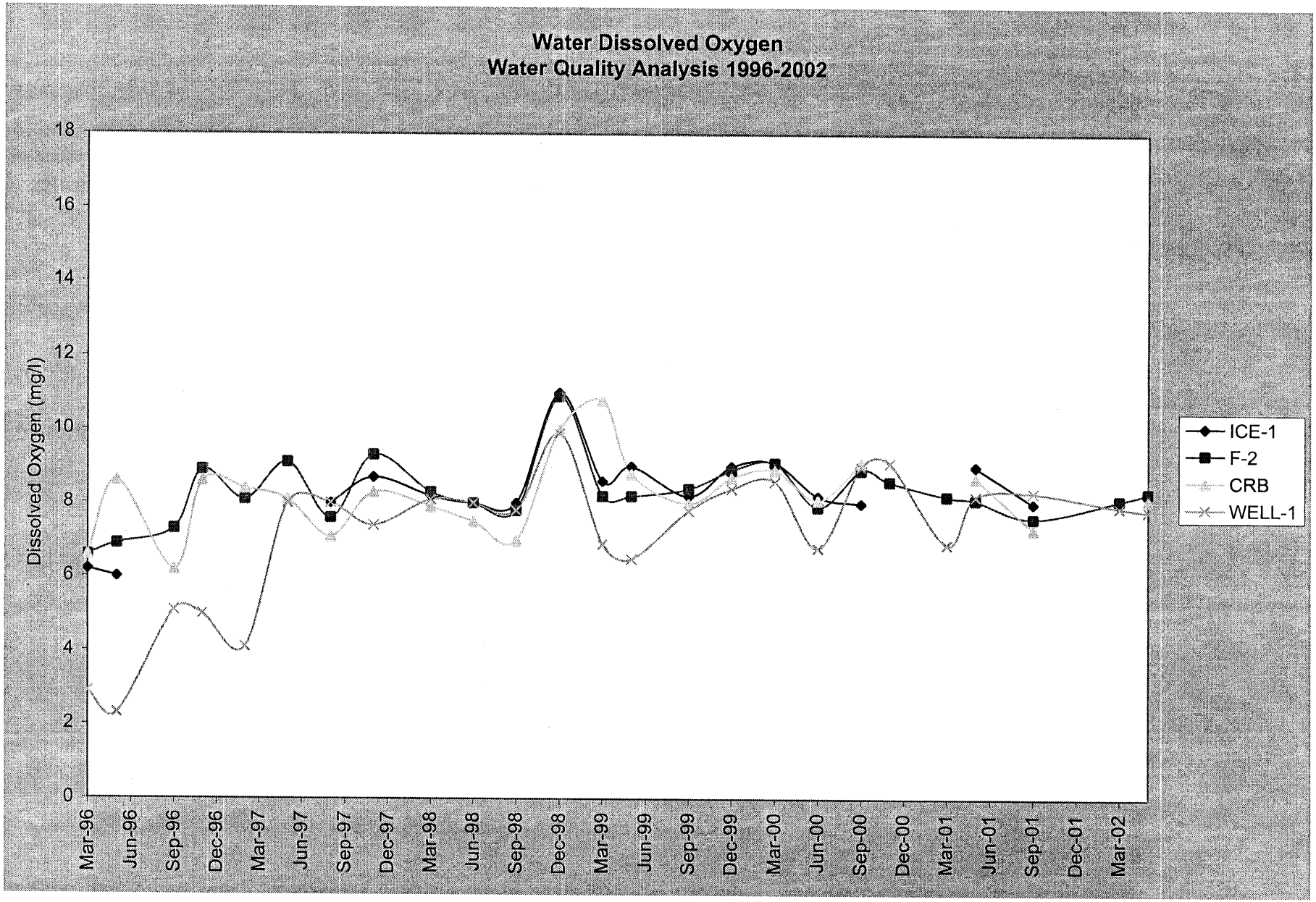
Mar-01
Jun-01
Sep-01
Dec-01
Mar-02
ICE-1
F-2
CRB
WELL-1

Figure 2


Water Dissolved Oxygen
Water Quality Analysis 1996-2002
Dissolved Oxygen (mg/l)
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2
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6
8
10
12
14
16
18
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Sep-96
Dec-96
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Mar-98
Jun-98
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Dec-99
Mar-00
Jun-00
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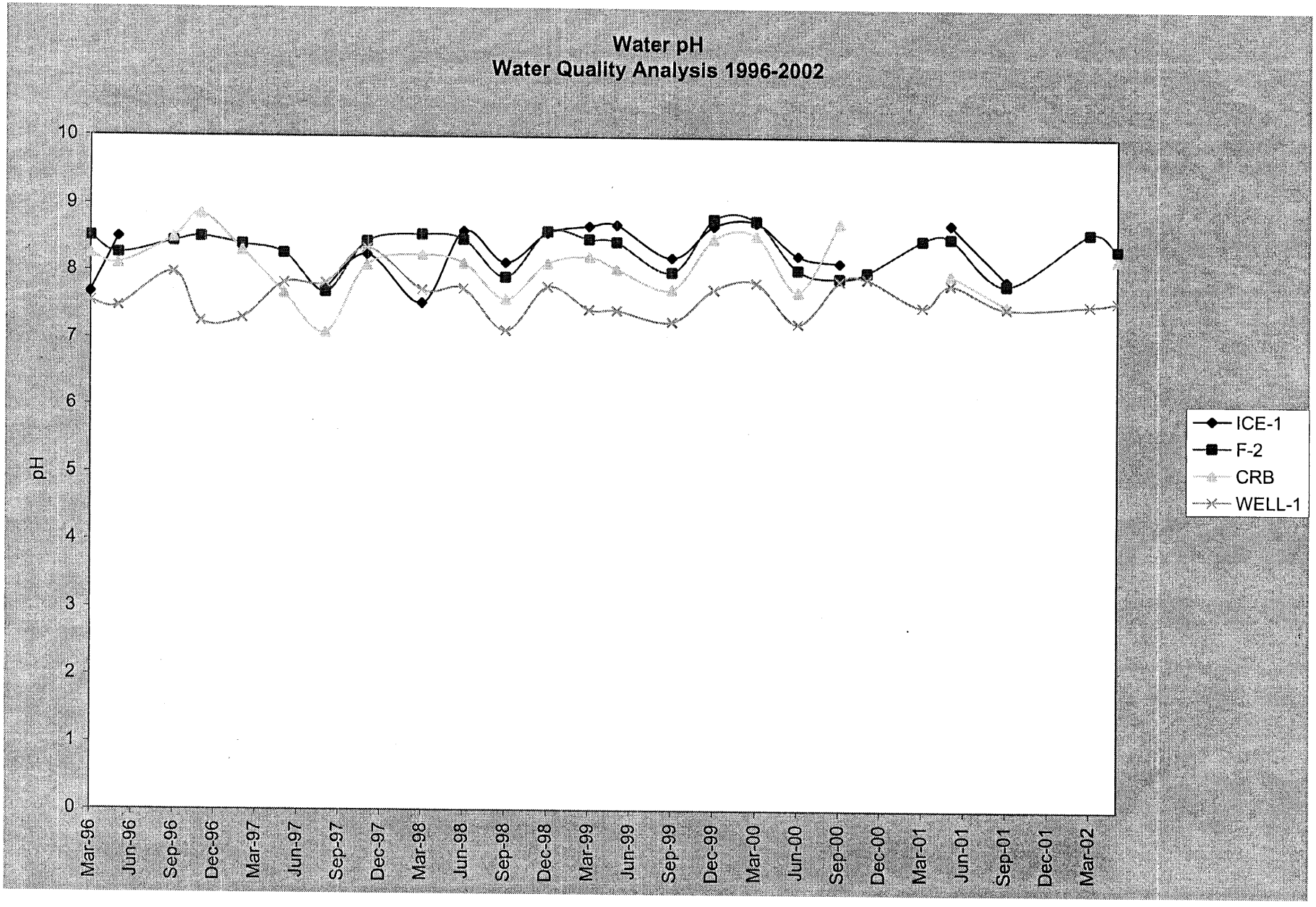
Mar-02
ICE-1
F-2
CRB
WELL-1

Figure 3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7
6
5
4
3
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Sep-96
Dec-96
Mar-97
Jun-97
Sep-97
Dec-97
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Sep-98
Dec-98
Mar-99
Jun-99
Sep-99
Dec-99
Mar-00
Jun-00
Sep-00
Dec-00
Mar-01
Jun-01
Sep-01
Dec-01
Mar-02
ICE-1
F-2
CRB
WELL-1

Figure 4

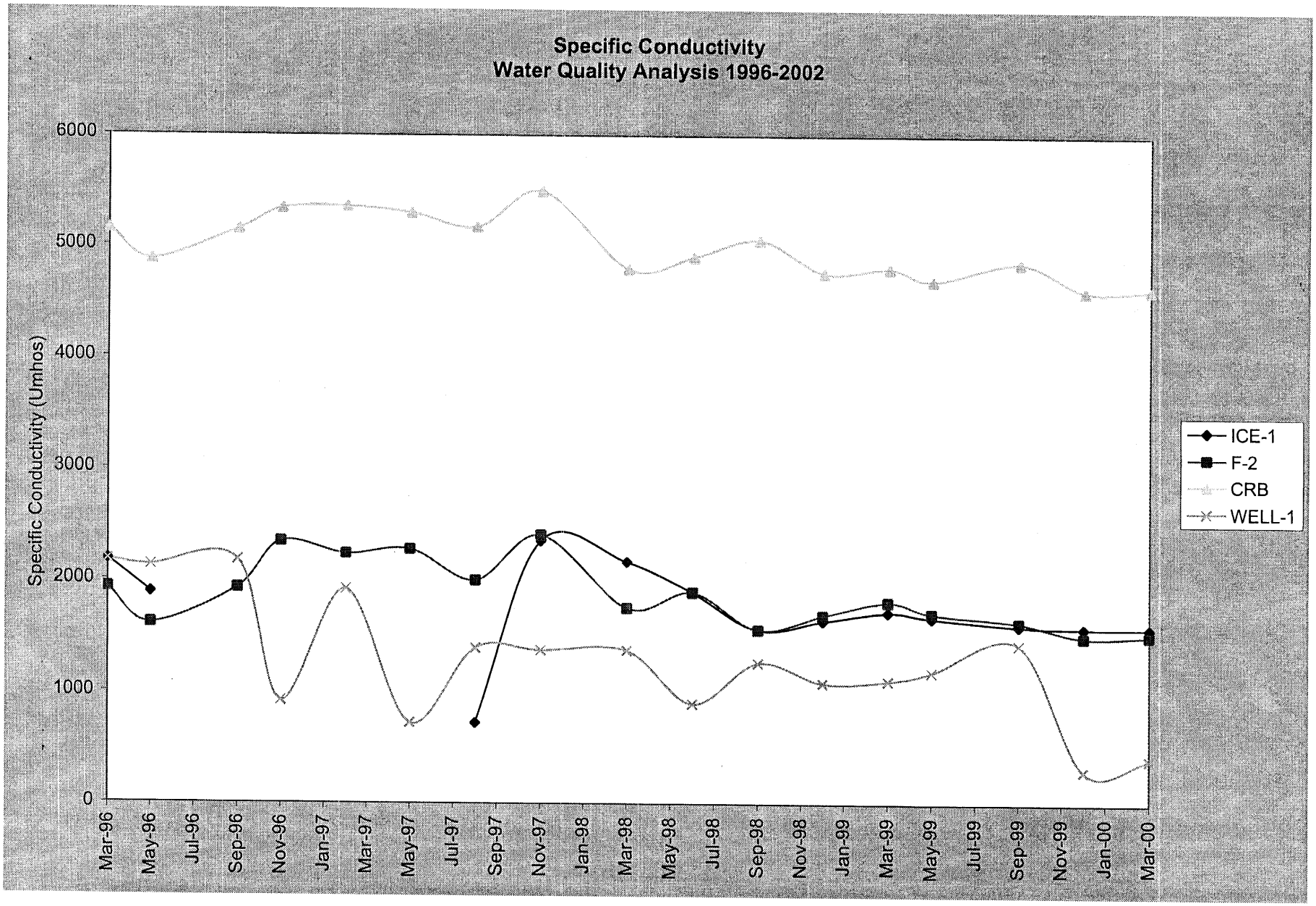

Specific Conductivity
Water Quality Analysis 1996-2002
Specific Conductivity (Umhos)
6000
5000
4000
3000
2000
1000
0
Mar-96
May-96
Jul-96
Sep-96
Nov-96
Jan-97
Mar-97
May-97
Jul-97
Sep-97
Nov-97
Jan-98
Mar-98
May-98
Jul-98
Sep-98
Nov-98
Jan-99
Mar-99
May-99
Jul-99
Sep-99
Nov-99
Jan-00
Mar-00
ICE-1
F-2
CRB
WELL-1

Figure 5

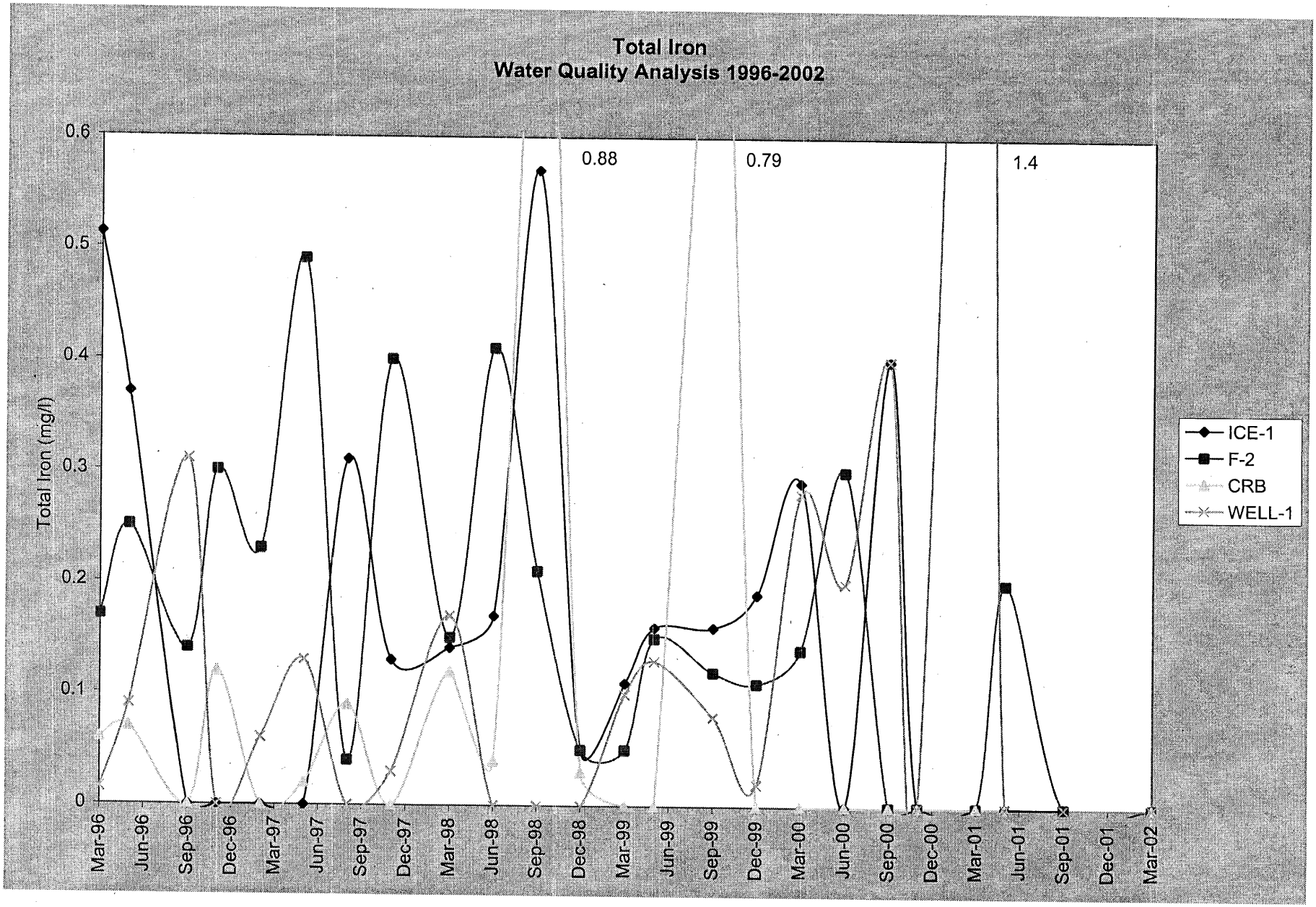

Total Iron
Water Quality Analysis 1996-2002
Total Iron (mg/l)
0.6
0.5
0.4
0.3
0.2
0.1
0
0.88
0.79
1.4
ICE-1
F-2
CRB
WELL-1
Mar-96
Jun-96
Sep-96
Dec-96
Mar-97
Jun-97
Sep-97
Dec-97
Mar-98
Jun-98
Sep-98
Dec-98
Mar-99
Jun-99
Sep-99
Dec-99
Mar-00
Jun-00
Sep-00
Dec-00
Mar-01
Jun-01
Sep-01
Dec-01
Mar-02

Figure 6

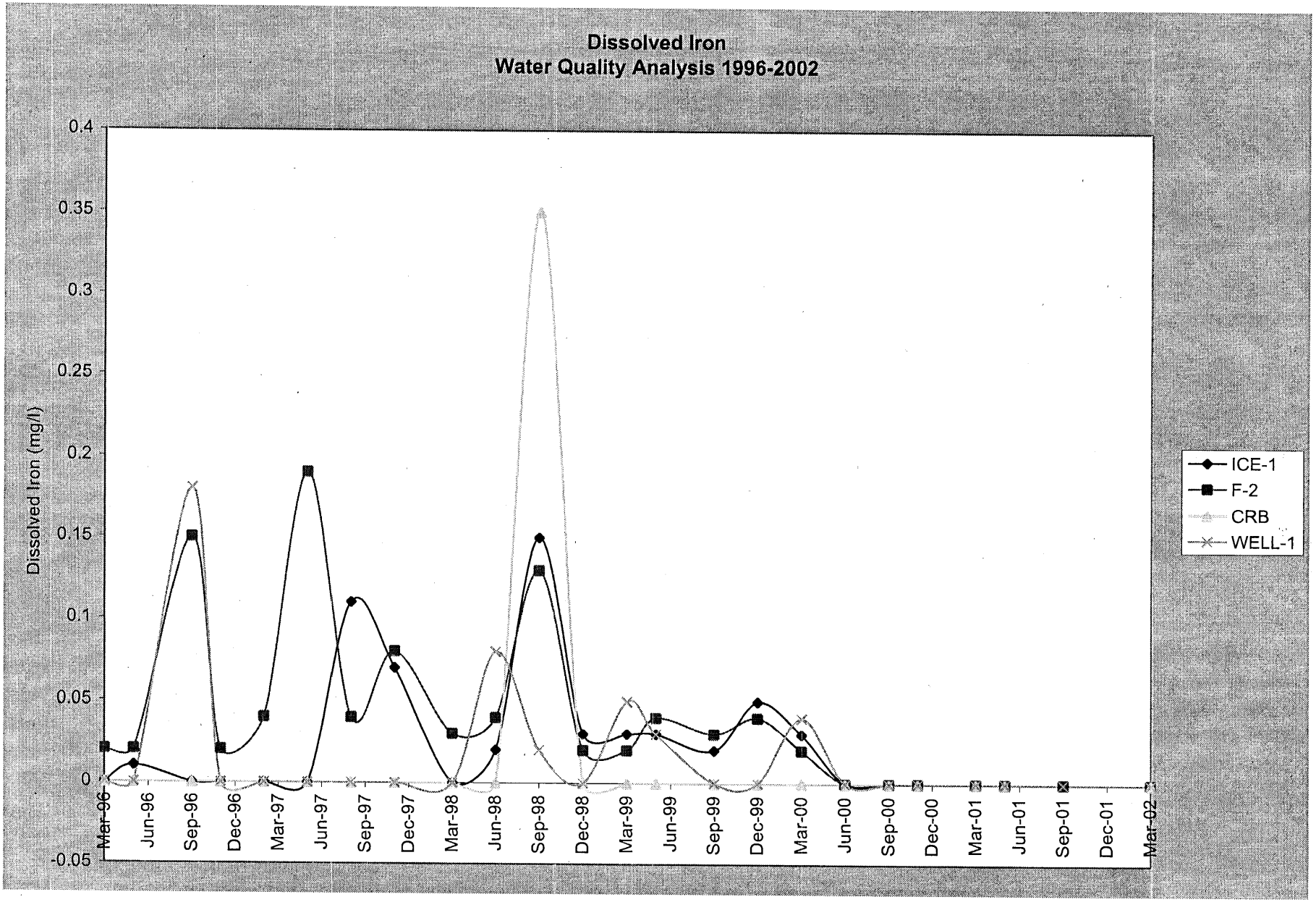

Dissolved Iron
Water Quality Analysis 1996-2002
Dissolved Iron (mg/l)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
Mar-96
Jun-96
Sep-96
Dec-96
Mar-97
Jun-97
Sep-97
Dec-97
Mar-98
Jun-98
Sep-98
Dec-98
Mar-99
Jun-99
Sep-99
Dec-99
Mar-00
Jun-00
Sep-00
Dec-00
Mar-01
Jun-01
Sep-01
Dec-01
Mar-02
ICE-1
F-2
CRB
WELL-1

Figure 7

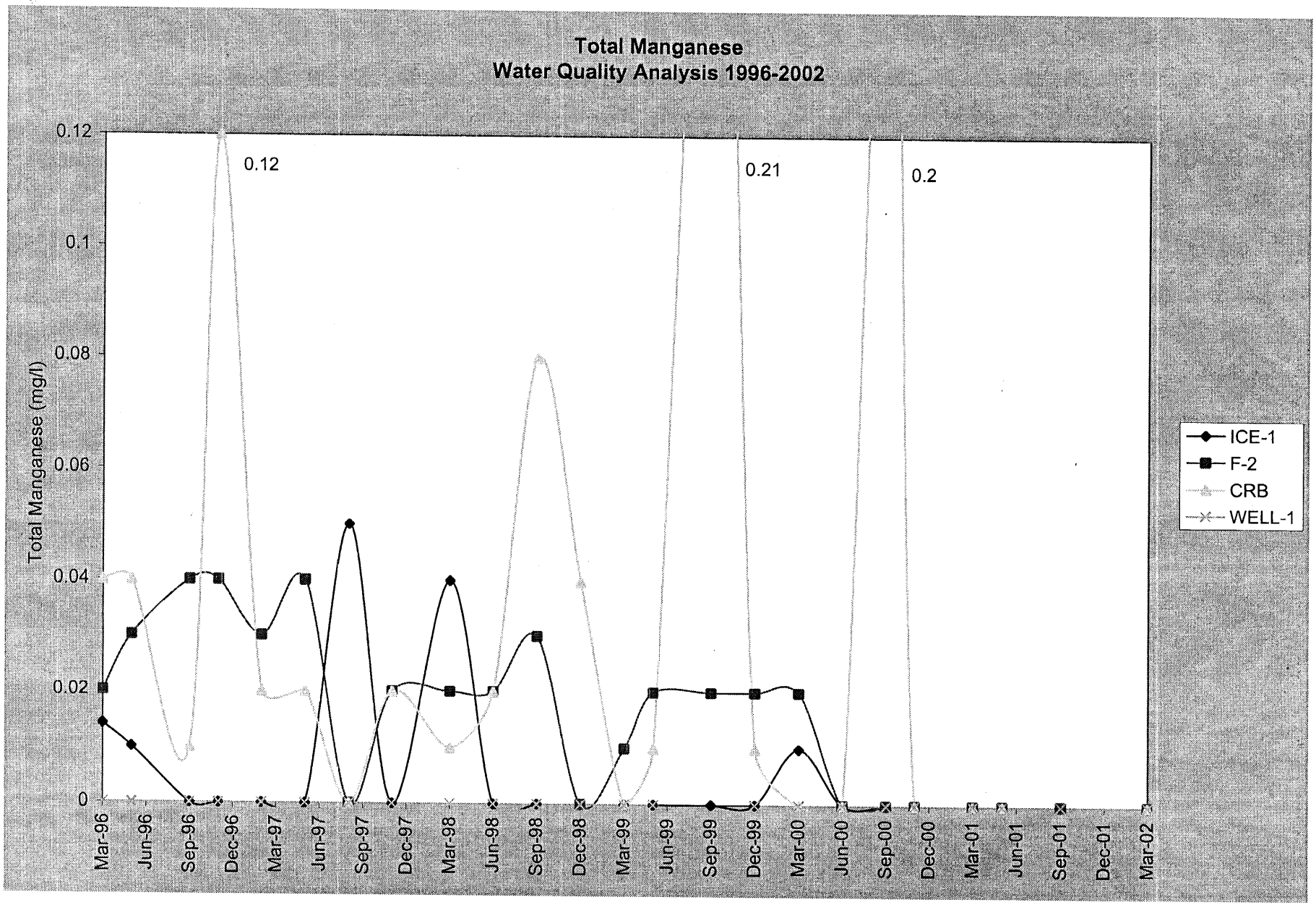

Total Manganese
Water Quality Analysis 1996-2002
Total Manganese (mg/l)
0.12
0.1
0.08
0.06
0.04
0.02
0
0.12
0.21
0.2
Mar-96
Jun-96
Sep-96
Dec-96
Mar-97
Jun-97
Sep-97
Dec-97
Mar-98
Jun-98
Sep-98
Dec-98
Mar-99
Jun-99
Sep-99
Dec-99
Mar-00
Jun-00
Sep-00
Dec-00
Mar-01
Jun-01
Sep-01
Dec-01
Mar-02
ICE-1
F-2
CRB
WELL-1

Figure 8

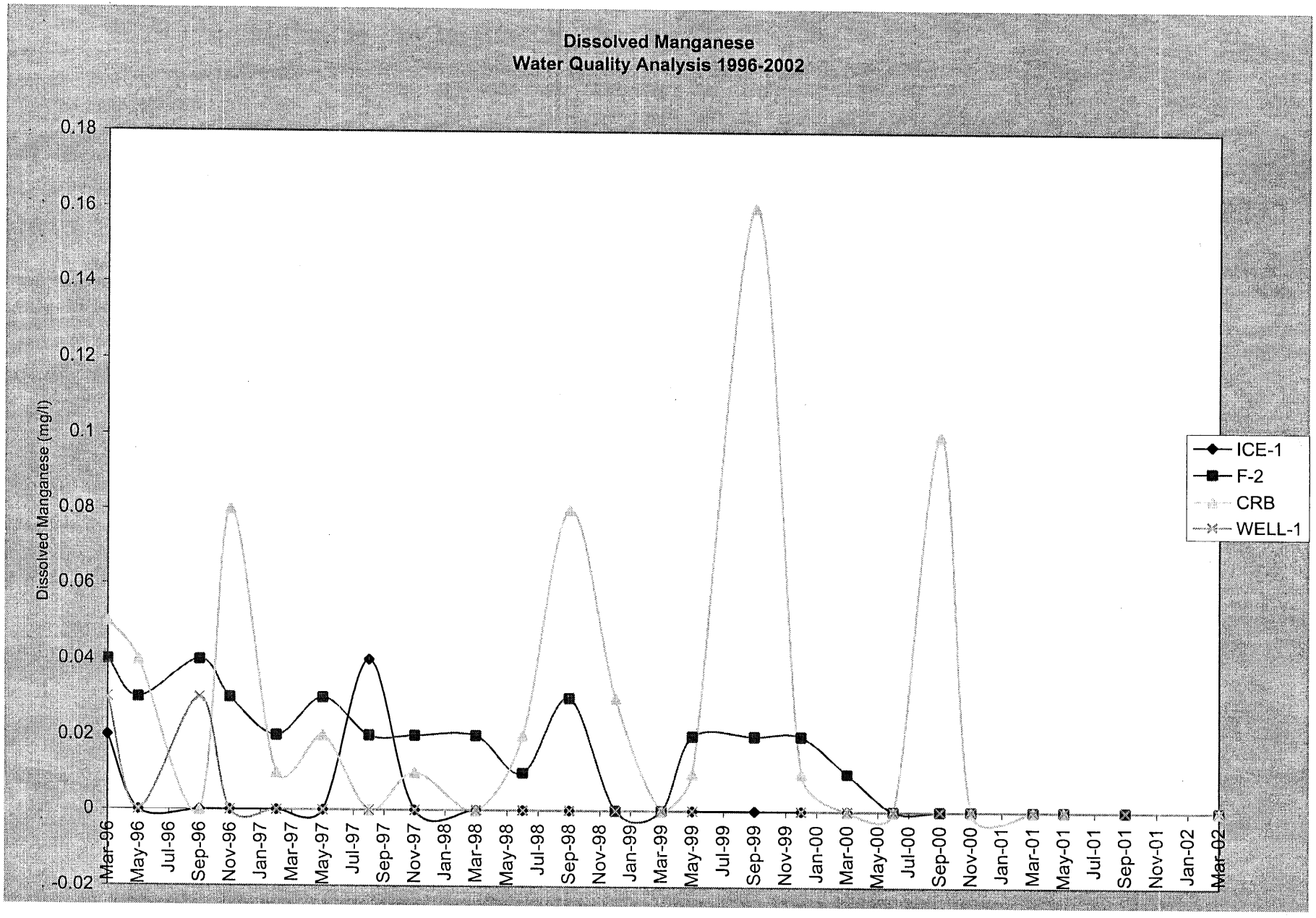

Dissolved Manganese
Water Quality Analysis 1996-2002
Dissolved Manganese (mg/l)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
Mar-96
May-96
Jul-96
Sep-96
Nov-96
Jan-97
Mar-97
May-97
Jul-97
Sep-97
Nov-97
Jan-98
Mar-98
May-98
Jul-98
Sep-98
Nov-98
Jan-99
Mar-99
May-99
Jul-99
Sep-99
Nov-99
Jan-00
Mar-00
May-00
Jul-00
Sep-00
Nov-00
Jan-01
Mar-01
May-01
Jul-01
Sep-01
Nov-01
Jan-02
Mar-02
ICE-1
F-2
CRB
WELL-1

Figure 9

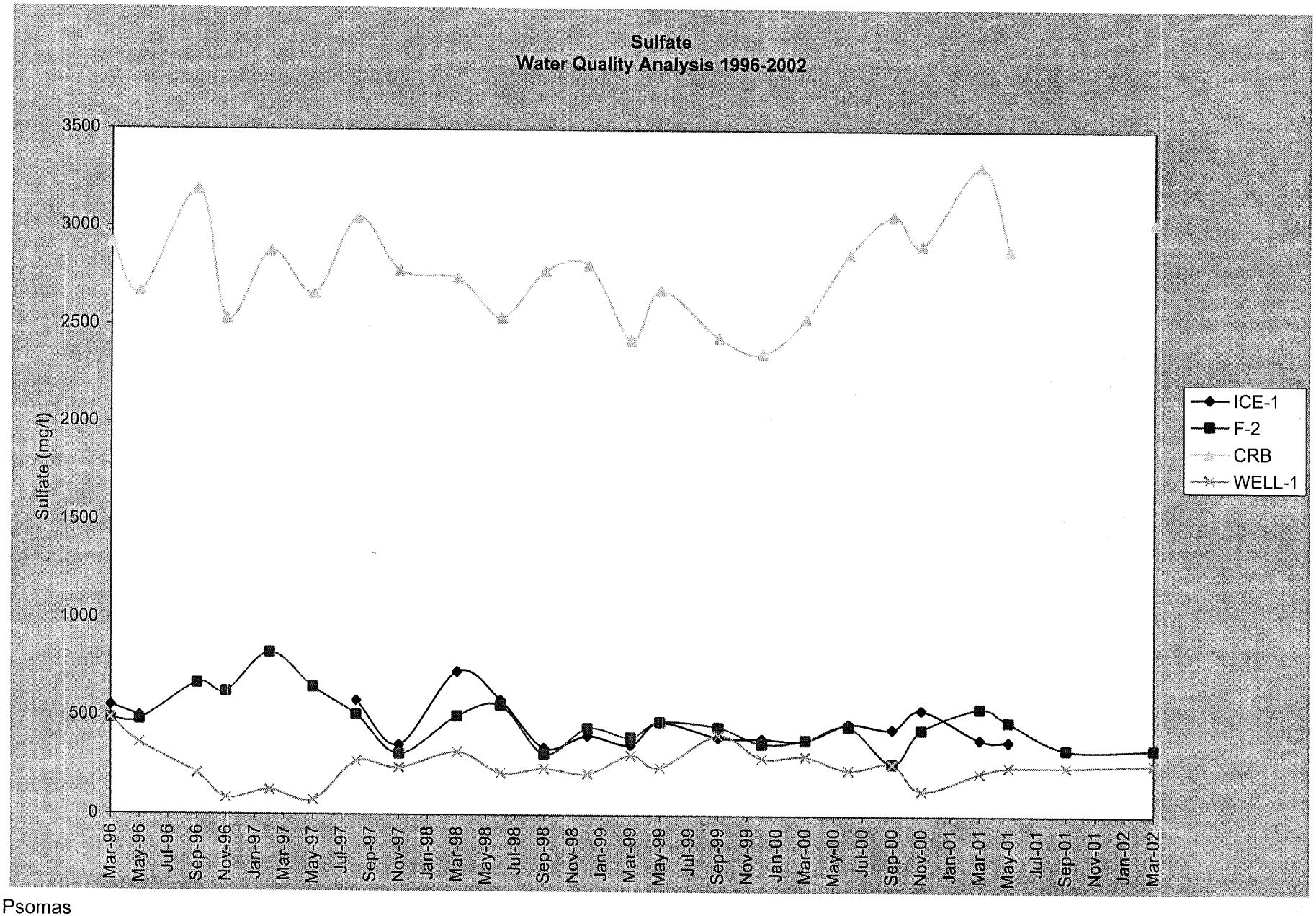
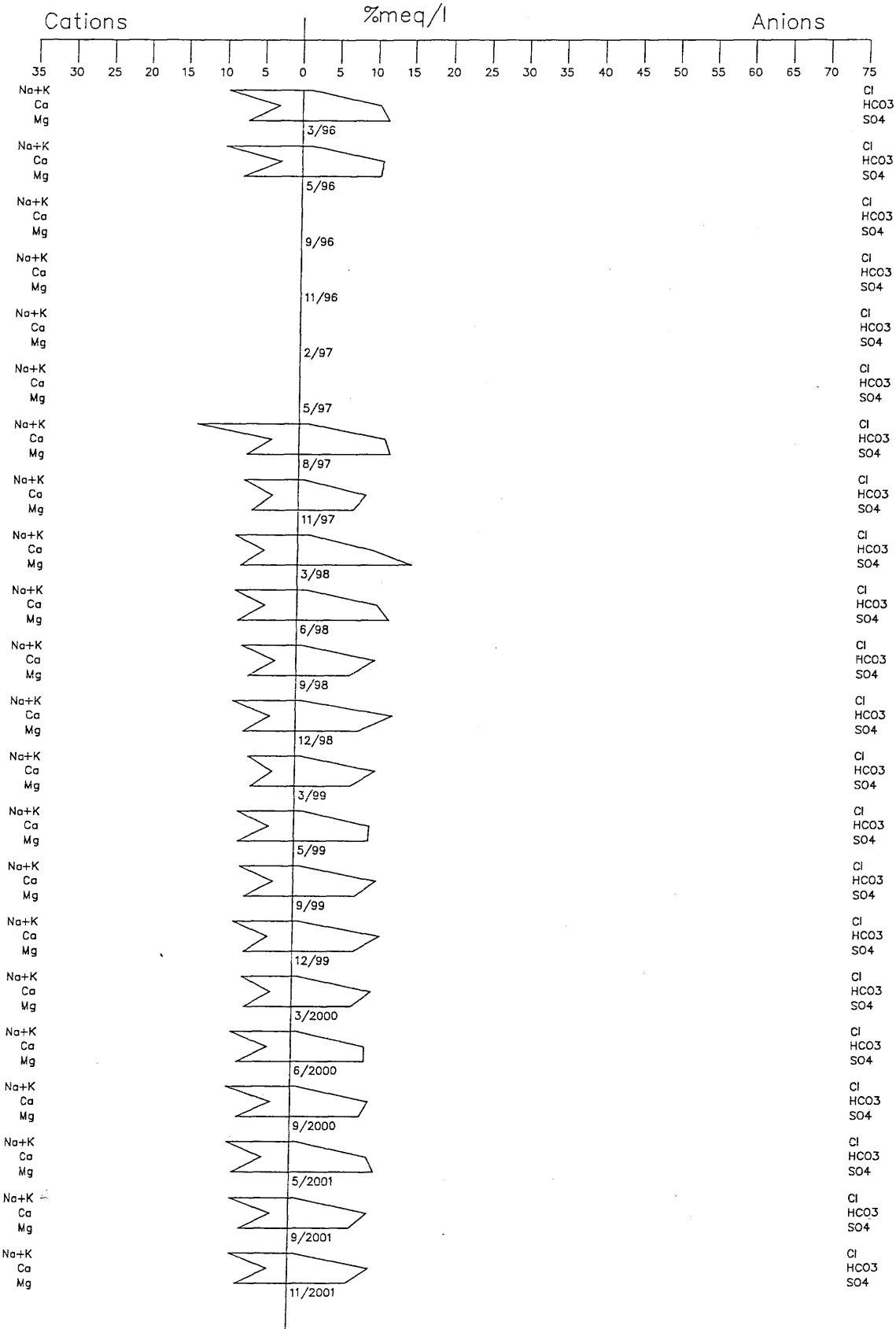

Sulfate
Water Quality Analysis 1996-2002
Sulfate (mg/l)
3500
3000
2500
2000
1500
1000
500
0
Mar-96
May-96
Jul-96
Sep-96
Nov-96
Jan-97
Mar-97
May-97
Jul-97
Sep-97
Nov-97
Jan-98
Mar-98
May-98
Jul-98
Sep-98
Nov-98
Jan-99
Mar-99
May-99
Jul-99
Sep-99
Nov-99
Jan-00
Mar-00
May-00
Jul-00
Sep-00
Nov-00
Jan-01
Mar-01
May-01
Jul-01
Sep-01
Nov-01
Jan-02
Mar-02
ICE-1
F-2
CRB
WELL-1

Figure 10

ICE-1



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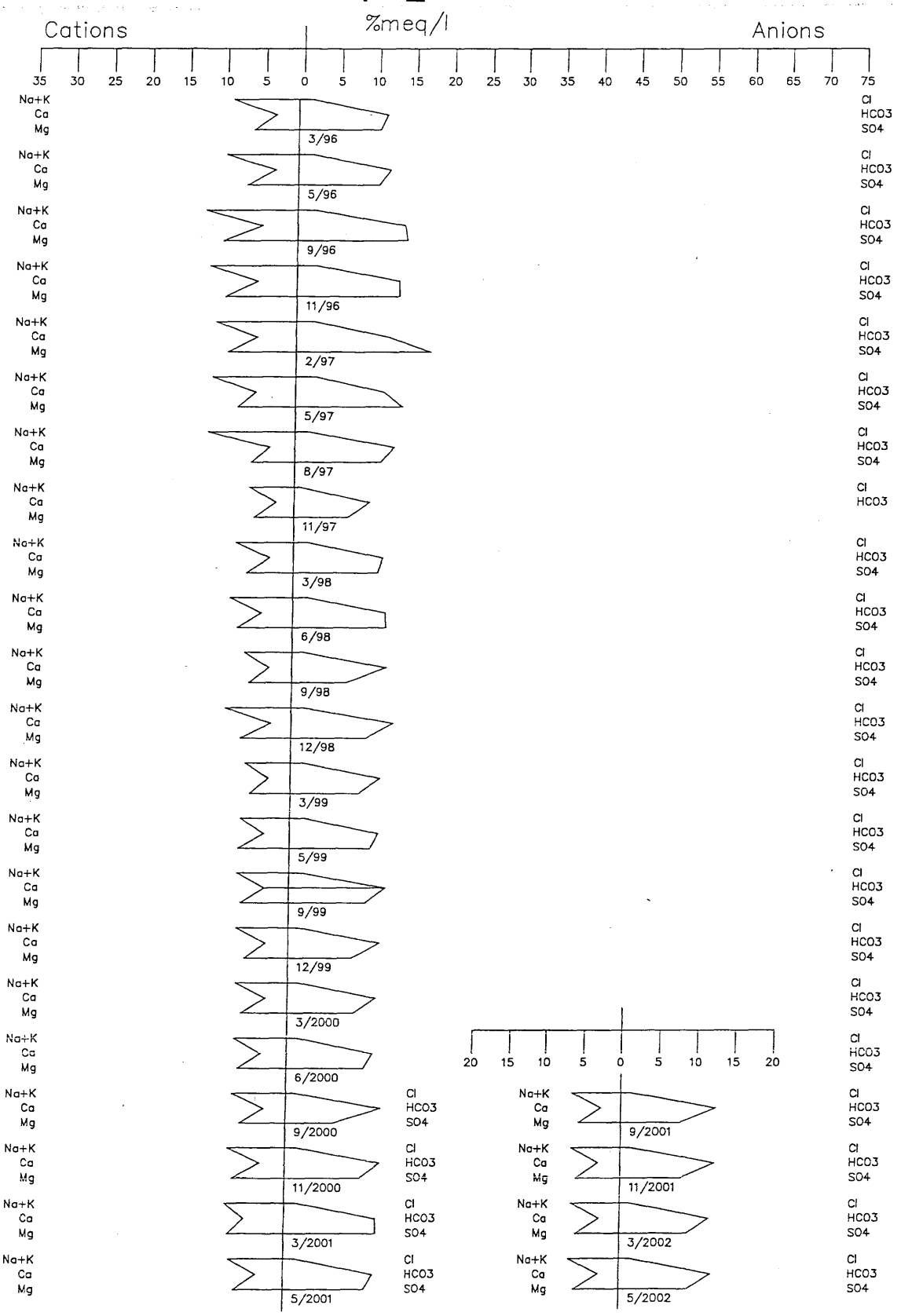
SUNNYSIDE COGENERATION ASSOCIATES

SURFACE & GROUND WATER MONITORING SITES
WATER QUALITY ANALYSIS 1996 – 2002

Scale:	PROJECT NO.
1"=20'	8SUN0105
Drawn by: CEA	FIGURE # 11
Checked by: SSC	

F-2



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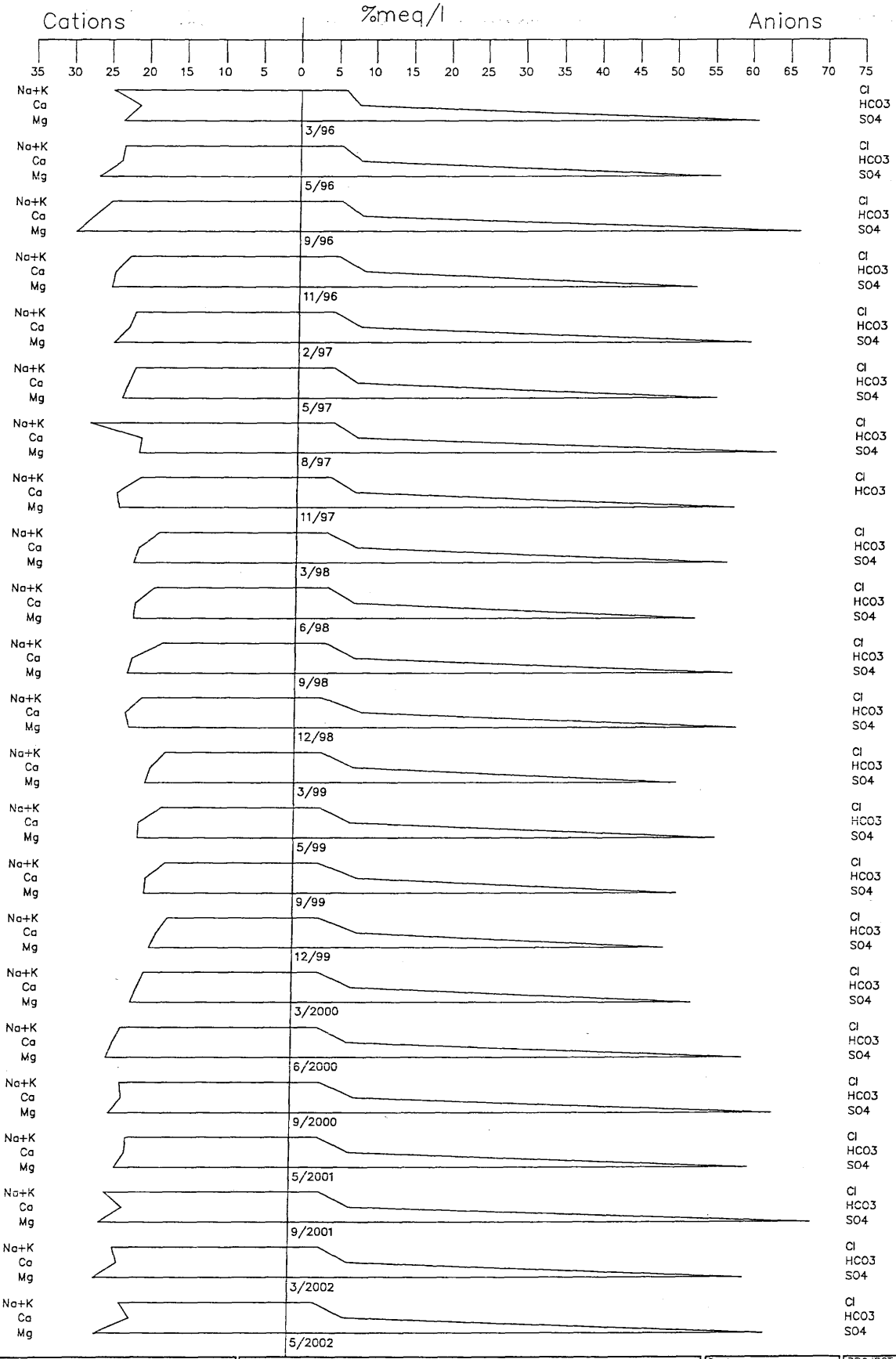
WATER QUALITY ANALYSIS 1996 – 2002

Scale:	PROJECT NO.
1"=20'	8SUN0105
Drawn by: CEA	FIGURE # 12
Checked by: SSC	

CRB



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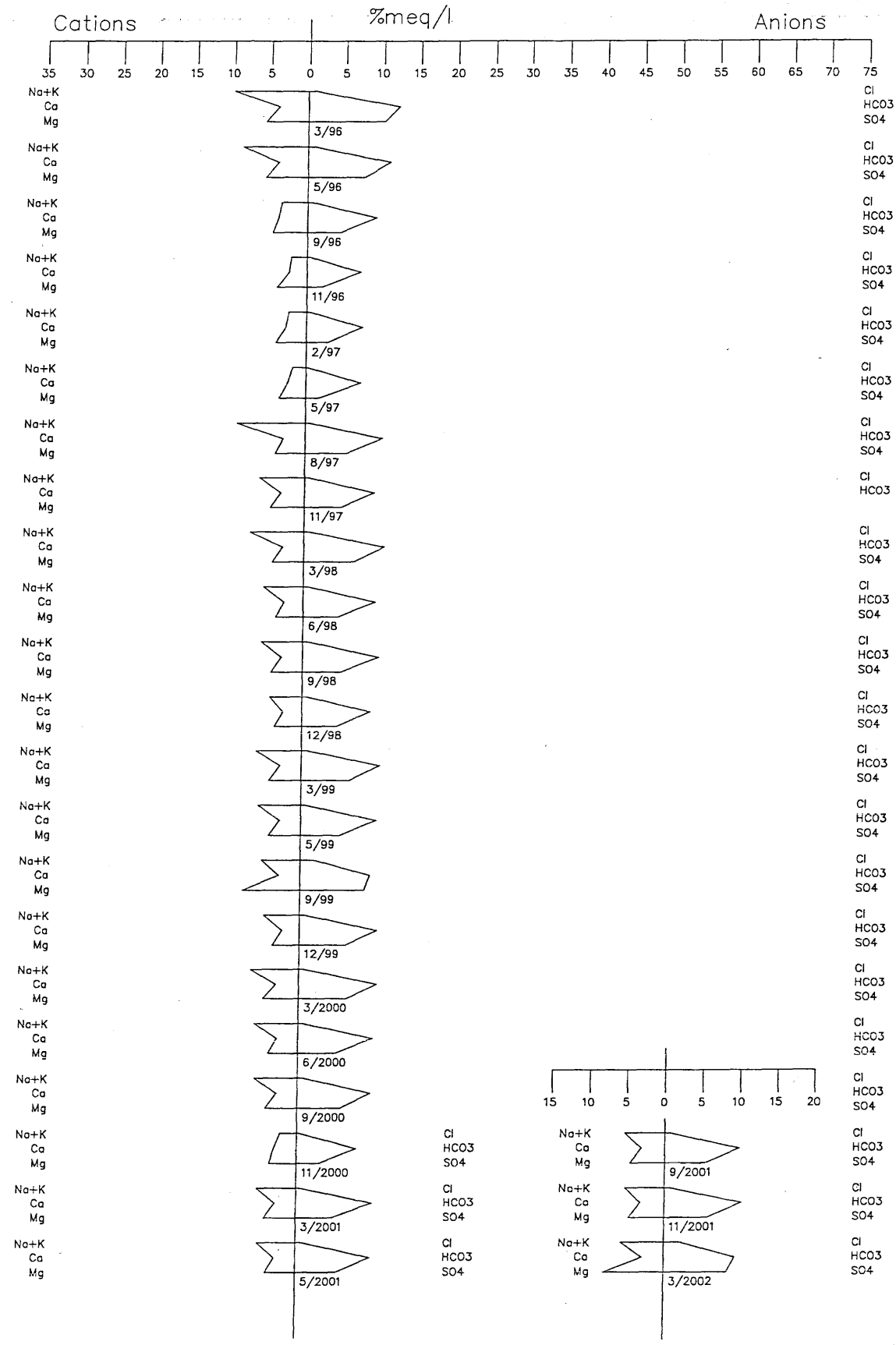
SURFACE & GROUND WATER MONITORING SITES
WATER QUALITY ANALYSIS 1996 – 2002

Scale: 1"=20'	PROJECT NO. 8SUN0105
Drawn by: CEA	FIGURE # 13
Checked by: SSC	

WELL-1



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SURFACE & GROUND WATER MONITORING SITES
WATER QUALITY ANALYSIS 1996 – 2002

Scale:	PROJECT NO.
1"=20'	8SUN0105
Drawn by: CEA	FIGURE # 14
Checked by: SSC	